A Professional Press Publication

HP Professional

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MAY 1988

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Locking Without Locking Up



WORKSTATIONS

High-Performance Video Techniques



SECURITY

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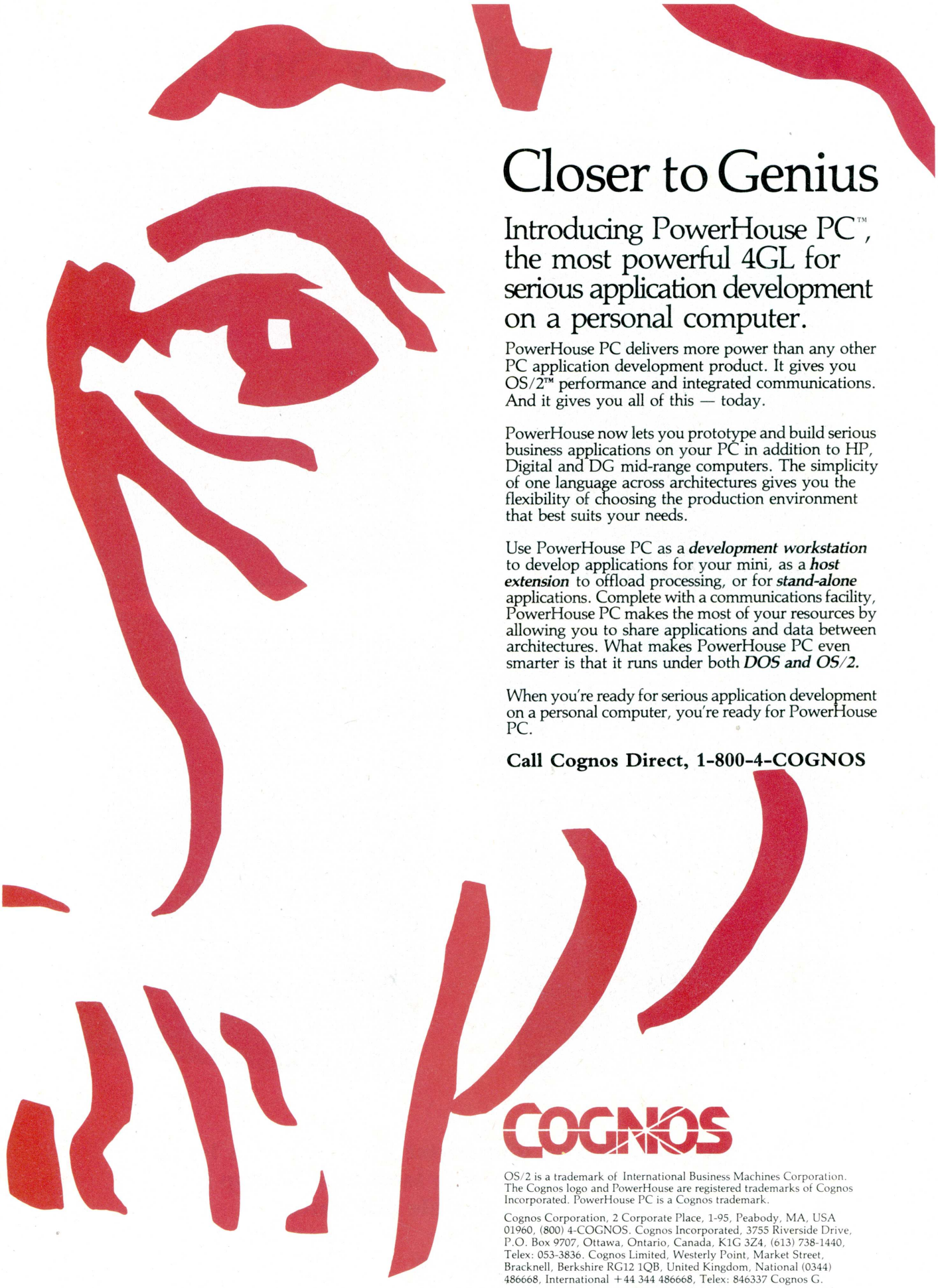
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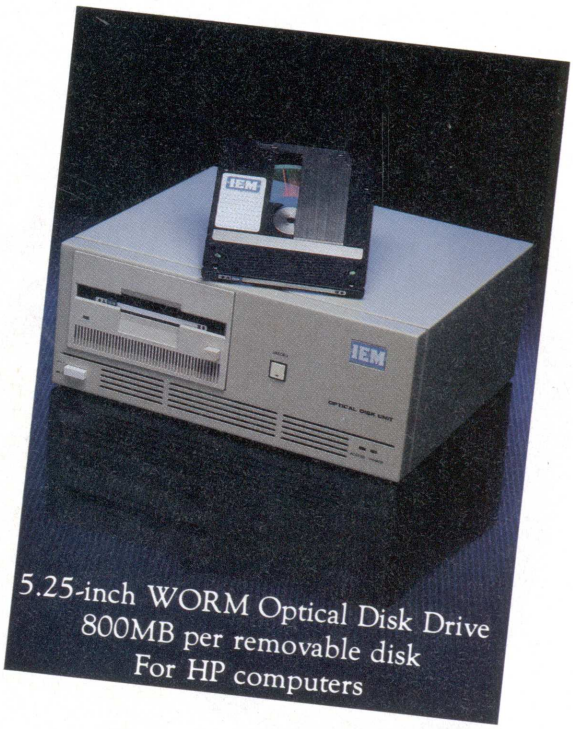
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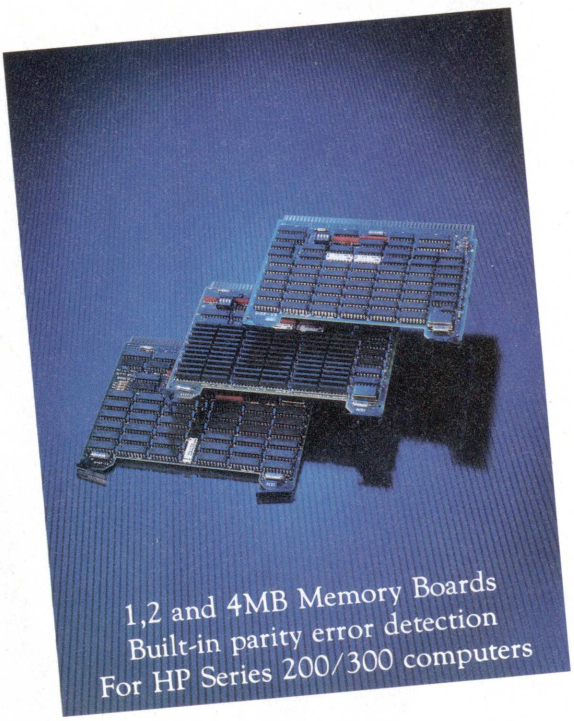
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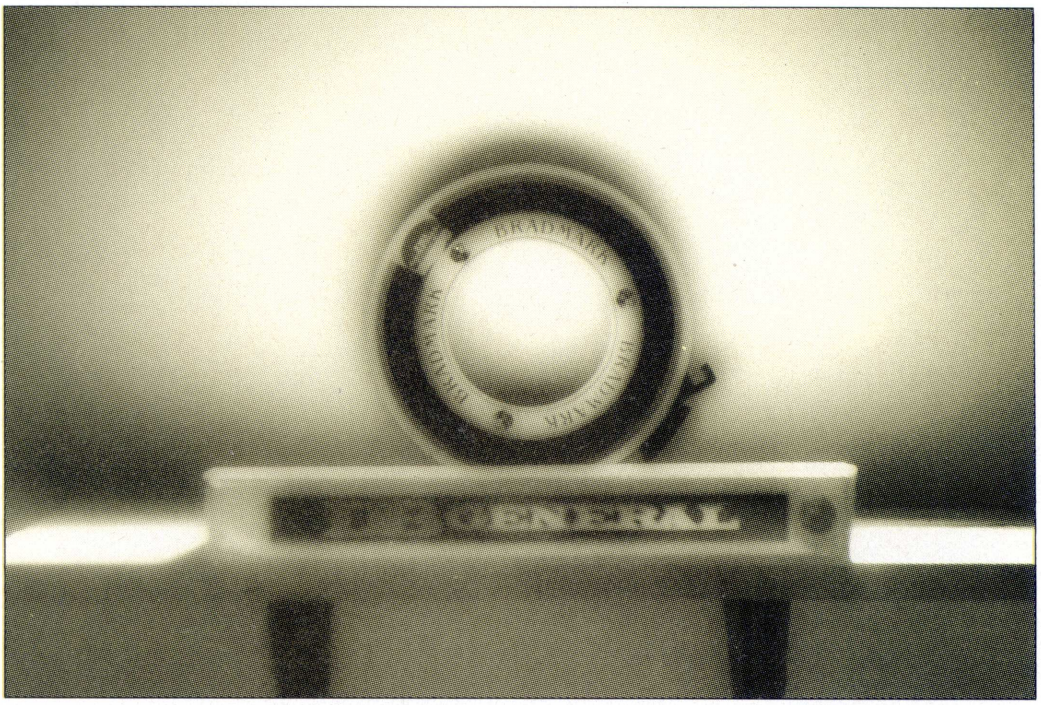
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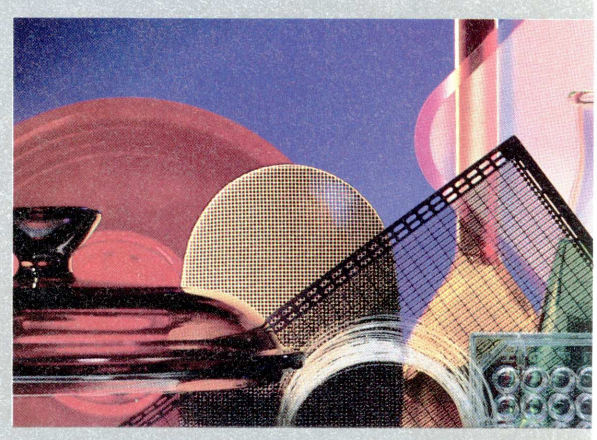
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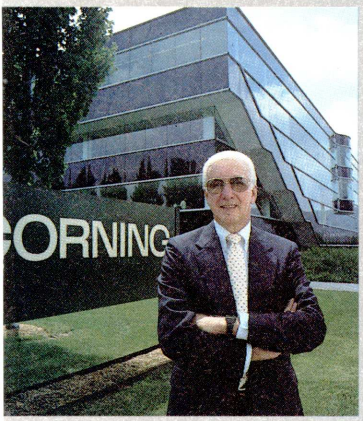
We look forward to seeing you at Digital's events during INTEREX in Orlando.

At Corning Glass, Computer Integrated Manufacturing isn't simply connecting all the diverse processes on the factory floor. "Here," reports Joe Hurley, Director of Advanced Manufacturing Systems, "the implementation of CIM and its implications are far more vast. Extending to engineering, marketing, even shipping. So every member of the manufacturing team can access, share and use information to solve problems and create opportunities."

What channels information to where it's needed, when it's needed, is a network from Digital. And for a couple of key reasons.

"For one thing, the VAX™ architecture, VMS™ operating system, and Ethernet network is a proven system," says Hurley. "And since every new Digital product adheres to the same strict communications standards, we can add computing power and still protect our initial investment."

Now what's the upshot of all this enhanced communication? "Well, changes can be made



"Computer Integrated Manufacturing that clearly boosts product quality at Corning Glass."

much earlier in the process," explains Hurley, "when they cost less. Also, production is faster. And if you can deliver in two months what takes your competitor six months, that's an advantage, especially when you're competing in a global market with high-tech products like fiber optics."

But while costs and time to market are going down, something else is going up. "We're seeing significant improvements in product quality," beams Hurley. "And since the Corning name is synonymous with quality, that's the single most important benefit for us."

To find out how Digital can give you a competitive edge, write: Digital Equipment Corporation, 200 Baker Avenue, West Concord, MA 01742. Or call your local sales office.

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A Micro PA Chip Set

In early April, HP rounded out the high and low ends of the product line with a series of announcements. It was illuminating to observe that the low-end HP 3000 units were actually just re-packs of the Micro3000 chip set and not a micro Precision Architecture offering.

I've been trying to figure out why there hasn't been a micro PA chip set ever since we started this magazine. Clearly, it's not because it's a difficult job. Rather, it's more like a graduate school term project. Recent announcements from other sectors of the computer market have finally put it in focus for me.

In the wings right now are two new merchant chip sets: the Sun-sponsored SPARC (coming from several manufacturers) and the Motorola 88000. Note that these beauties clock in at between 12 and 20 MIPS!

That's about a 5x factor from the current crop of 68020/80386. The industry is not ready for a leap of power as great as that. You have to shell out really huge amounts of cash for a 12-20-MIPS machine today.

Fortunately for us users, technology is still driven by innovation and not by various companies' cash flow projection models. If several vendors pull 12-20-MIPS chip sets out of the wraps, then the industry will have to resize their offerings and go along. Lucky us.

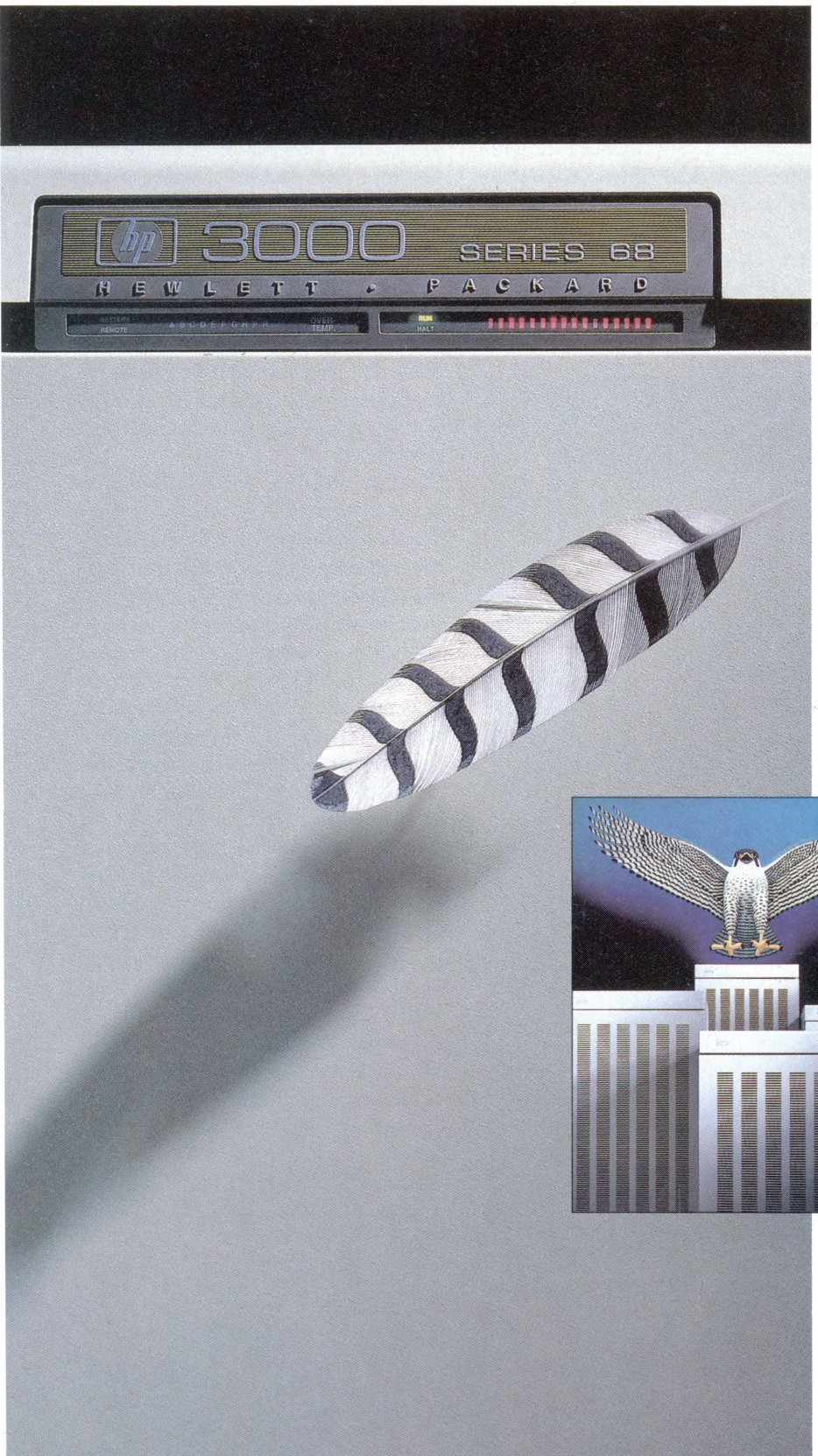
So, I project that when we do see a micro PA chip set, it will be in the league of the 88000 and SPARC. It will be sometime late in '89, and it will correspond with a repositioning and repackaging of the rest of the PA line (i.e., new, faster processors).

A chip set does not a computer make. Fifteen-MIPS machines require devilishly fast backplanes, memory interconnects and caches, or they can't operate at that speed. A 15-MIPS machine with nothing to do is a big waste. Fifteen-MIPS workstations are much easier to achieve than 15-MIPS mid-frames; however, 15-MIPS workstations will tilt the balance of everyone's product lines.

In the meantime, comfort yourself with the fact that the price/performance of the entire HP-PA line as sold today is fiercely competitive and far better than that of either IBM or DEC.



Don't let another fast Falcon Disk Subsystem pass you by.



If poor performance and insufficient disk capacity have got your HP 3000 bogged down, try a bird of a different feather — EMC's Falcon Disk Subsystems. High speed Falcon subsystems make HP 3000 systems fly while saving you more than just chicken feed!

With state-of-the-art Winchester technology and EMC's proprietary caching algorithm, Falcon disk subsystems really get your system performance off the ground. Featuring four megabytes of controller cache, the Falcon soars through even the worst I/O bottlenecks.

Every situation is different. No one has the same storage requirements, so now there is a whole family of Falcons to choose from. Pick the capacity to fit your needs. You can even configure up to 5.34 gigabytes in a single cabinet.

The Falcon Family

Falcon 400	*~ 406 megabytes*
Falcon 600	*~ 625 megabytes*
Falcon 800	*~ 890 megabytes*
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Sealed Winchester technology makes high maintenance costs a thing of the past. In some cases, you can even buy or lease a Falcon for what you are now spending just to maintain and operate your older drives. And a 50,000 hour Mean Time Between Failure rating makes the Falcon the most reliable subsystem in its field.

To further assure reliability, every Falcon is fully compatible with HP's sophisticated fault isolation diagnostics. EMC's network of Sales and Service locations worldwide provides on-the-spot service.

Falcon Series disk subsystems are available today. Don't let another one pass *you* by, join the thousands of satisfied HP 3000 users who already have a Falcon up and flying.

For more information, contact your local EMC sales representative or call:

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INDUSTRY WATCH

Peggy King

NewWave Update

On March 15, the day after the NewWave Developers Toolkit was shipped, Hewlett-Packard held a developers conference to publicize the NewWave application environment announced last November (see Industry Watch, December '87).

The Developers Toolkit, priced at $895, includes a five-volume documentation set consisting of a programmers guide, reference manual, program design examples, style guide and design rules for the user interface. Included in the toolkit are a Performance Pack with memory maps and timers, a runtime library and an encapsulation library, which provides tools for integrating current MS-DOS-based programs into the NewWave environment. A five-day developers training course and a three-month support contract also are available to value-added businesses and independent software developers.

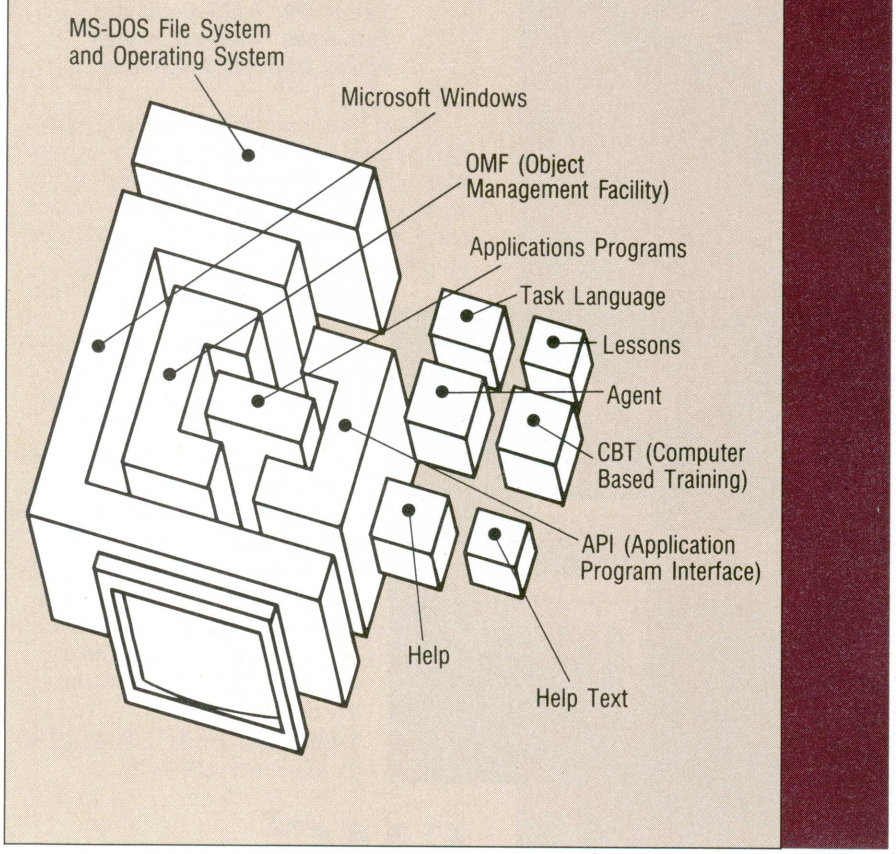
The day after the developers conference and a mile away from the new San Jose Fairmont Hotel where it was held, Apple Computer filed a lawsuit in U.S. District Court charging that the "look and feel" of NewWave, based on Microsoft Windows, is too similar to the Macintosh user interface. Consequently, the features of the NewWave environment that resemble the Macintosh, the icons, the mouse, the scroll bars and the pull-down menus, already are well publicized.

Less attention has been given to some innovative aspects of the NewWave environment that will benefit both users and developers. For the developers, the Object Management Facility (OMF) goes beyond Microsoft Windows by providing system routines that manage the relationships between NewWave objects and allow them to communicate with one another. The Application Program Interface (API) is a set of programming intrinsics that allow applications to take advantage of the OMF.

The API provides the foundations for Help and Computer Based Training (CBT) scripts that will run on top of an application. The code for writing CBT programs for applications was shipped as part of the NewWave Developer's Kit. At the conference, HP announced that animation tools to accompany CBT will be provided free to developers. Application-specific help messages can be integrated with the NewWave help facility.

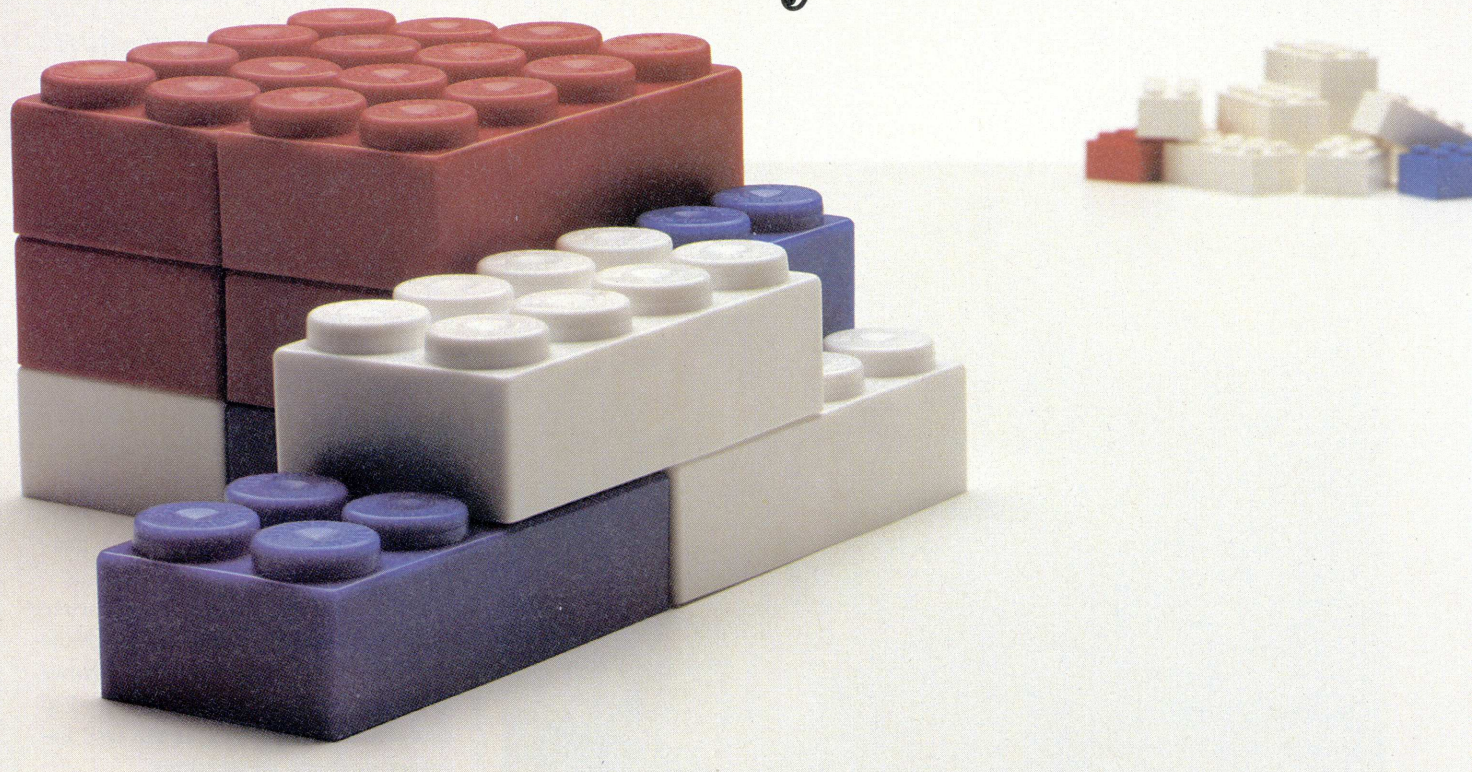
NewWave also offers the end user a range of leading edge features. The

FIGURE 1



Important elements of the HP NewWave Environment.

Customize your own information center facility . . .



with the DataExpressSeries modular approach.

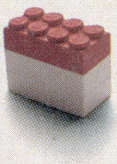


FOUNDATION: The core module of the DataExpressSeries links end users to their data on the HP3000. It accesses IMAGE™, KSAM, MPE and SD files to select, compute, sort, reformat and download data to PC applications.



STRUCTURE: The DataExpressSeries has a common menu and catalog structure. Full function key support provides even easier end user access to data. With Reflection™, downloads are automatic.

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In short, the DataExpressSeries is a simple, powerful information center solution to meet your needs and budget today. Since you can add options and interfaces at any time, it provides a clear growth path to solving all your HP3000 data interchange needs in the future.

So, if you want to expand the power of your information center, call IMACS and ask how the DataExpressSeries can help you and your end users.

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Users need not have their own NewWave running on their own personal computers to benefit from the environment.

level of system integration surpasses that of the Macintosh. The "hot links" capability of the Object Management Facility allows changes to one file to be made automatically in related files from other applications. The high level of integration also makes it easy to integrate electronic mail with other office productivity applications.

HP has planned for future enhancements of NewWave through the sophisticated Agent facility that allows users to automate the steps involved in completing a task, even if the task involves multiple applications.

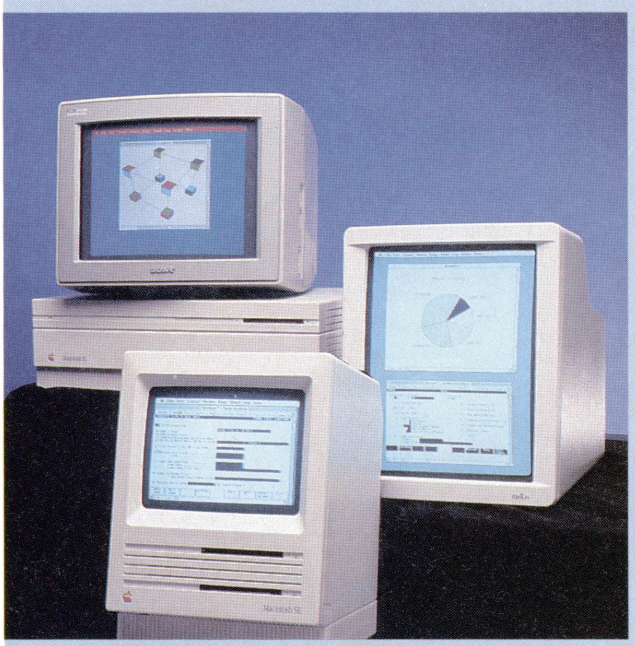
In designing the Agent to be an intelligent macro, HP has provided a clear path to incorporating the advances of artificial intelligence. With expert systems, agents can be "trained," and one day this training could occur by means of natural language.

Users need not have their own NewWave running on their own personal computers to benefit from the environment. Terminals and Vectra PCs that continue to use HPDESK or other electronic mail products will be able to use a "browser" that converts a NewWave mail message to ASCII text.

NewWave is clearly more than a duplicate of Macintosh icons and concepts.

—Peggy King is an independent consultant and free-lance writer based in San Jose, CA.

Welcome to the next generation of HP terminal emulation software for Macintosh.



Tymlabs is pleased to introduce **Session**, a family of emulators which links the Apple Macintosh to the HP3000, 9000 and 1000. Building on four years of experience with Mac2624, our original block mode product for the Mac, we have evolved a set of connectivity solutions which take advantage of the revolutionary developments in Macintosh hardware and software, offering unprecedented power and user friendliness.

Business Session™ (formerly Mac2624) is the foundation of the family, emulating an HP 2392 block mode terminal. Business Session runs under Apple's MultiFinder, so you can flip between HP and Mac applications, performing terminal operations and file transfers in background mode. **Graphic Session**™ adds support for the graphics capabilities of the HP 2393, and lets you "plot" output on an Apple LaserWriter or ImageWriter, either directly or from another Mac application. **Color Session**™ gives you the color text and graphics capabilities of the HP 2397.

If you've got a Mac, get Session. There is no better HP terminal emulator. If you haven't got a Mac, get one. There is no better personal computer.

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OpenView Embraces OSI Architecture

Offers Future Links To IBM NetView

Hewlett-Packard recently announced HP OpenView, a comprehensive network-management offering for wide- and local-area multivendor communications that embraces the Open Systems Interconnection (OSI) network-management architecture.

At the core is HP OpenView Windows, a graphical user interface running on the Vectra PC that provides a central point from which network managers can better manage networked HP systems and devices from multiple vendors.

A network manager can monitor and troubleshoot local and remote networks using network-management information gathered by six new HP OpenView WAN (wide area network) and LAN (local area network) products as well as a broad range of existing HP AdvanceNet networking products.

HP OpenView will offer future links to IBM's NetView network-management offering.

There are four new HP OpenView products for WAN management:

- *HP OpenView Status and Diagnostic Monitor software for the HP 3000, which monitors the status of remote HP 3000s and performs end-to-end network- and protocol-level diagnostics.*
- *HP OpenView Performance Monitor software for the HP 3000, which collects network-performance information that can be used to optimize communications traffic.*
- *HP OpenView Network Command Interpreter HP 3000 software, used with the HP OPT/3000 software, which allows a manager to execute commands and programs remotely, track remote HP system use and fine-tune the performance of those systems.*
- *HP OpenView ITIMS Manager software, which allows a manager to perform centralized line analysis and fault isolation for telecommunications lines and devices.*

The new HP OpenView WAN-management products provide management for CCITT X.25, packet-switched and IBM-SNA networks, as well as dial-up and point-to-point leased-line connections.

The new products expand the network-management functionality available to WAN managers through HP's WAN protocol-analysis tools and the HP X.25 Private Packet Network, which uses the HP 9000 to perform company-wide X.25 network management.

HP OpenView offers LAN managers many of the same capabilities as their WAN counterparts, tailored for the LAN environment:

- *A new HP OpenView Bridge Manager allows a LAN manager to manage network bridges within a company facility from an HP OpenView Windows station.* Network costs can be reduced by monitoring, controlling and optimizing communications-bandwidth use.

By controlling which computers may send information over a network bridge, the Bridge Manager also provides improved network security.

In addition to helping manage WANs, the Status and Diagnostic Monitor, Performance Monitor and Network Command Interpreter software can be used in LAN environments to manage local HP systems and devices.

Current HP Business Systems Plus software for the HP 3000 complements the new HP OpenView LAN capabilities by providing greater control and efficiency in managing PC LANs. Using the software, a LAN manager can distribute PC software as well as back up PCs on a LAN.

SCT Signs With HP As Systems Integrator For Gov't., Education

Combines HP Hardware, Software With Custom-Programming

Systems & Computer Technology Corporation (SCT; Malvern, PA) has signed as a systems integrator for government and education markets with Hewlett-Packard.

As an HP systems integrator, SCT will combine HP hardware and software with its own custom-programming services, market expertise and facilities-management capability to create complete systems for state and local governments, schools and other institutions. The national agreement covers all HP products.

SCT provides a wide range of systems-integration solutions including application software, information-resource management services, telecommunication services and custom software development.

HP Announces OS/2 For Vectra PCs

Vectra RS/16, 20 Now Being Shipped

Hewlett-Packard has announced its release of Microsoft Corporation's Operating System/2 for the HP Vectra ES and HP Vectra RS PCs.

HP also announced that it has begun shipping the HP Vectra RS/16 with a 16-MHz 80386 microprocessor and the HP Vectra RS/20 with a 20-MHz 80386 microprocessor.

The HP Vectra RS/20 is available in four basic models, plus a special bundled configuration for maximum performance and data storage (HP Vectra RS/20 Power User PC).

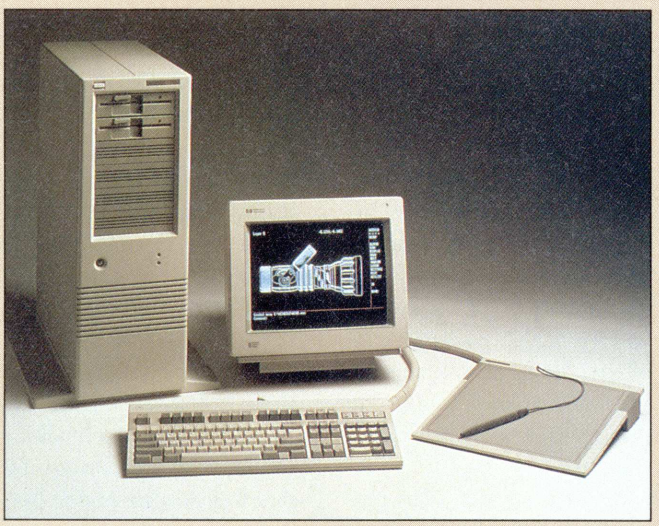
Referred to as the next-generation operating system, OS/2 is a single-user, multitasking operating system for PCs with the Intel 80286 or 80386 microprocessor. The multitasking feature of OS/2 enables users simultaneously to run up to 12 OS/2 applications.

By providing access to a maximum 16 MB of memory, OS/2 allows users to access large programs and data files. With MS-DOS, users were limited to a maximum of 640 KB of memory.

In addition, OS/2 has a compatibility mode that emulates MS-DOS 3.3 to allow most MS-DOS applications to run under OS/2.

HP will offer three versions of Microsoft's OS/2:

- *OS/2 1.0 Version A, for the HP Vectra ES, ES/12, RS/16 and RS/20 PCs.*
- *OS/2 1.0 Version B, which adds support for the original HP Vectra PC and HP-specific accessories.*
- *OS/2 1.1, which includes the Presentation Manager graphical interface.*



In conjunction with announcing OS/2, HP began shipping the Vectra RS/16 and RS/20. The RS/16, shown here, has a 16-MHz 80386 microprocessor.

HP, Intellicorp Sign Agreement To Port Software

Develops AI Software

Hewlett-Packard and Intellicorp Inc. recently announced an agreement under which Intellicorp will develop and market artificial intelligence (AI) software products on the HP 9000 Series 300 and 800 high-performance workstations and servers.

Intellicorp's flagship product, the Knowledge Engineering Environment (KEE) system will be available from Intellicorp for HP's workstations in late 1988. SimKit and KEEconnection are scheduled to be available on HP platforms in mid-1989.

Intellicorp Inc. is a leading developer of software based on AI technology. The KEE system (introduced in 1983) became the first commercially developed and supported software product to enable individuals without substantial AI experience to develop knowledge-based systems.

DataLogiX Joins VAB Program

DPS Works With HP-UX

DataLogiX Formula Systems Inc., a supplier of business and manufacturing software for process manufacturers of formula-based products, is the latest software supplier to join Hewlett-Packard's Value-Added Business (VAB) program.

DataLogiX Process Software (DPS) is an advanced software solution for the emerging formula-based manufacturing marketplace. It works with the HP-UX operating system on HP 9000 Series 800 multiuser computers, based on reduced-instruction-set computing (RISC), and on the HP 9000 Series 300 workstation family.

DPS ($35,000—$250,000) is an integrated set of 1,500 programs covering process manufacturing, distribution, financial and accounting functions, and regulatory compliance. DPS helps reduce inventories by providing accurate physical counts of all raw materials and helps low raw-material costs by substituting less expensive materials when appropriate and available. By tracking varying costs associated with different raw materials that make up a bulk product, DPS helps to accurately cost and price finished goods.

Now in its infancy, the mostly untapped business- and manufacturing-control software market consists of approximately 60,000 formula-based manufacturing facilities in the U.S. These facilities produce products for markets such as food processing, specialty chemicals, pharmaceuticals, printing inks, paints and specialty coatings, adhesives, flavors and fragrances.

Tymlabs, Bradmark Combine Technical, Marketing Activities

Well-Known Vendors In 3000 Market

Tymlabs Corporation and Bradmark Computer Systems Inc. have announced plans for cooperative development and marketing activities.

Tymlabs is known in the HP 3000 and Apple Macintosh marketplaces for over a dozen software products including system backup facilities, terminal emulation solutions and language compilers. Bradmark is the developer and vendor of DBGENERAL, a widely installed database management utility for the HP 3000.

Current and future DBGENERAL users will be able to purchase a $1,500 add-on module providing IMAGE backup and restore capabilities that replace the function of HP's DBSTORE utility. This module will employ the high-speed, compressed-format backup technology of Tymlabs' BackPack product to reduce the time required to back up databases by approximately 35 percent to 50 percent and to cut tape requirements by 50 percent or more.

To ensure compatibility with transaction logging and recovery, HP's DBSTORE requires users to back up each IMAGE database separately on individual tape sets. The new DBGENERAL module maintains compatibility with logging and recovery, but greatly increases convenience by allowing users to store any number of databases in a single pass on a single tape set.

Although high-speed, compressed-format, multi-database backup has been available in the full-blown BackPack product, the new DBGENERAL module will provide Bradmark's users with a way to gain this particular set of benefits at a reduced cost.

Bradmark has secured an agreement whereby Bradmark, Bradmark Europe and its other international affiliates will be able to provide customers who purchase the backup module with an opportunity to upgrade to the BackPack product. The full feature set of the product includes the ability to back up all types of files (not just databases), an unattended or "operatorless" backup facility, support for multiple tape drives, SYSDUMP capability and more.

For one year from the date they purchase the DBGENERAL backup module, Bradmark customers will receive credit for the price of the module toward their BackPack purchase. Ongoing technical support for purchasers of the full BackPack product will be provided by experienced support representatives at Tymlabs in the U.S., Wick Hill Associates in England, Tymlabs-APPIC in France and Megatec in Australia.

Tops Purchases $1.8 Million In HP Computers, ADI Software

Provides Information On Inventory And Sales

Tops Appliance City, one of the nation's largest appliance and consumer electronics retailers, has purchased $1.8 million in American Data Industries (ADI) software and HP computers to provide inventory-control disciplines and sales-management information.

The purchase includes ADI's flexible and fully integrated inventory control, purchasing and financial-accounting software which runs on the HP 3000.

Seventy-five HP 150 personal computers will be used as point-of-sale cash registers and terminals.

ADI will provide ongoing technical support, training and consulting services in systems and inventory management to support Tops' existing MIS staff. The system is scheduled to be fully operational in mid-1988.

ADI, founded in 1975, is a national-account member of HP's Solutions Marketing Program.

HP, CIMLINC Form Marketing Pact

Ports CAM Package To 9000 Series 300

Hewlett-Packard and CIMLINC Inc. (Elk Grove, IL) have announced an agreement to market software from CIMLINC on HP's low-priced workstation platform.

CIMLINC, which offers a full line of CIM and CAD/CAM packages based on a UNIX operating system and running on 32-bit engineering workstations, has begun to port its computer-aided manufacturing (CAM) package, CIM CAM, and accompanying post-processors to the HP 9000 Series 300 workstation family.

CIM CAM ($7,800 plus additional post-processors) will complement ME Series 10 and 30, HP's computer-aided design (CAD) packages, which form the mechanical portion of the HP DesignCenter Solutions for design automation. A 2½-inch axis machining package with five-axis positioning, CIM CAM will run with the X Window System environment and link directly to ME 10. The customized products are based on HP-UX.

"CIMLINC can provide full solutions for manufacturing, engineering and the factory to tie into the HP DesignCenter approach," said John West, president and CEO of CIMLINC.

CIMLINC and HP will share customer support responsibility, with HP taking ownership of customer training, and telephone hotline support for CIM CAM. CIMLINC will provide custom post-processor generation and support, as well as advanced application-engineering work after installation.

Business Software That's Easy to Use and Hard to Outgrow

You need software that grows with your business—MCBA's easy-to-use business software for the Hewlett-Packard 3000 and the HP Vectra.

MCBA has been providing comprehensive, integrated accounting, distribution and manufacturing software to businesses since 1974.

Today, tens of thousands of users worldwide applaud MCBA's powerful features and ease-of-use. And they appreciate our straightforward documentation, written for the day-to-day user—not the technical expert.

You Won't Outgrow MCBA

MCBA software runs on any HP 3000 computer, large or small. So when your company grows and you expand to a more powerful HP 3000, your MCBA software goes with you—saving you precious training and installation time.

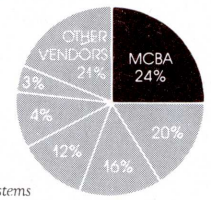
MCBA packages work together smoothly as an integrated system. But you need not install them all at once. You can start with just the software you need to handle your most pressing business needs. And add more MCBA packages when you're ready.

MCBA—The Market Leader

An independent study in *HP Professional** confirms that MCBA is the leader in accounting software for the HP 3000 with 24% of the market (see pie chart). The study states:

"The market leader, MCBA, was one of the earliest companies to provide accounting software for the HP 3000 and has used its extensive value-added distributor network to achieve its position. MCBA's accounting software is straightforward, well-tested and well-documented. This fact, plus the market presence created by hundreds of MCBA distributors who are ready and willing to customize any module, has brought MCBA a lot of success."

HP 3000
Accounting Software Market Share by Vendor
MCBA 24%
Source: *Highgate Financial Systems*



Market share was based on number of modules installed on individual CPUs for each vendor's accounting software products.

Note: "Other Vendors" includes all vendors who have one percent or less of the total market.

Information from *HP Professional*, Vol. 1, No. 6, November 1987; "Debits/Credits Revised" by Robert E. Shelley; published by Professional Press, Inc., 921 Bethlehem Pike, Spring House, PA 19477, (215) 542-7008.

Find Out More About MCBA

Find out more about MCBA. Complete and mail the coupon below today. Or call the MCBA office nearest you.** (Reseller inquiries are also welcome.)

Complete this coupon and mail to:

MCBA, Dept. A, 425 W. Broadway, Glendale, California 91204-1269.

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MCBA's COBOL Software for the HP 3000 (call for package availability): Accounting: Accounts Payable, Accounts Receivable, General Ledger, Fixed Assets and Depreciation, Payroll. **Distribution:** Purchase Order and Receiving, Customer Order Processing, Inventory Management, Sales History. **Manufacturing:** Bill of Material Processor, Job Costing, Labor Performance, Master Scheduling, Material Requirements Planning, Shop Floor Control, Standard Product Costing, Standard Product Routing, Capacity Requirements Planning. **PC/MS-DOS™ software for the HP Vectra is also available.**

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ENTER 159 ON READER CARD

Innovus Establishes Software Conversion, Support Center

HP To Contribute Series 300, 800 Hardware

Under a new agreement with HP, Innovus Inc. will act as a specialized center for worldwide conversion and support of third-party software on the HP 9000 Series 300 and 800 computers operating under HP-UX.

Innovus, a private Canadian company formed in 1984 to convert and support scientific-oriented, third-party software to HP computers, will work directly with third-party software developers to port their products to the HP 9000 platforms. Particular emphasis will be placed on recruiting software developers aimed at the scientific and analytical marketplace, a key market for the HP 9000.

The intent of the agreement is to provide an HP-supported center that will make it easy for third-party vendors to migrate their packages to the new HP platforms and provide them with ongoing support in the HP marketplace.

Innovus Inc. has been involved in the conversion and support of a variety of proprietary software products using the HP-UX operating system since its initial release in 1983. Among the packages Innovus presently supports on the HP 9000 computers are SPSS-X, a data analysis system from SPSS Inc.; SIR/DBMS, a research DBMS system from ISI Inc.; BMDP, a comprehensive statistical package from BMDP Statistical Software Inc.; and Minitab, an interactive data analysis system from Minitab Inc.

HP's contribution to this center will include both HP 9000 Series 300 and 800 hardware systems, including the new Model 835 TurboSRX, for use in conversion and ongoing support. HP will expand the base of non-proprietary software available under HP-UX by contracting Innovus to convert needed public domain software products.

Solutions Marketing Program Offers New Benefits

Eleven National Accounts Added

New benefits have been added to HP's Solutions Marketing Program for value-added businesses (VABs). The program consists of value-added resellers (VARs) and software suppliers.

The HP Solutions Marketing Program combines HP's established National Account Program and multiple regional account programs under the same umbrella, providing for greater consistency in strategy and implementation.

The program offers several new benefits to qualifying VABs including identified account managers for the joint HP/VAB marketing of HP computer systems, HP educational support and tuition assistance, specific sales literature pertaining to the HP Solutions Marketing Program, and a merchandising-support program for joint HP/VAB events.

VABs are selected as national accounts on the basis of market focus and must qualify by adhering to HP standards of performance in sales and customer satisfaction and support. Regional accounts must meet similar standards of performance, but cover a specific geographical area.

HP also added 11 national accounts to the program, which includes three VABs for commercial systems — Harris & Paulson Inc. (Denver, CO), InfoCraft Inc. (Lawndale, CA) and Mitchell Humphrey & Co. (St. Louis, MO). The remaining eight accounts provide technical systems support: Accugraph Corporation (formerly HolguinCAD Systems; El Paso, TX), Analog Design Tools and GenRad Inc. (Sunnyvale, CA), PDA Engineering (Costa Mesa, CA), Structural Dynamics Research Corporation (Milford, OH), Swanson Analysis (Houston, PA) and VLSI Technology Inc. (San Jose, CA).

Sony Conducts DAT Seminar With HP

Offers Standards For Tape-Drive Manufacturers

Hewlett-Packard and the Sony Corporation recently presented their digital audio tape (DAT) data-storage format and licensing standards in a day-long seminar with 26 leading computer tape-drive manufacturers.

HP and Sony first announced their intentions to jointly develop a range of DAT-based data storage products for the computer market last August.

Recognizing the importance for the proposed format standard to be accepted by the tape-drive industry, HP and Sony will make their DAT data-storage format specifications available to all interested parties.

Seminar participants expressed considerable interest in the features of the HP/Sony format, in which a DAT-based, data-storage product can store more than 1.3 GB of information on a standard audio tape and have a data-transfer rate of 11 MB per minute.

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BackPack™ is a product and trademark of Tymlabs Corp.

Novell Endorses TCP/IP Gateway For NetWare

Ideal Model For Third-Party Developments

Novell Inc. formally has endorsed MICOM-Interlan's TCP/IP Gateway for NetWare. The endorsement follows a joint development effort, which has been described by Novell officials as the company's ideal model for third-party developments.

Because of the history of cooperation between the two companies, Novell saw the TCP/IP Gateway for NetWare as the logical choice for recommendation to NetWare users and developers.

The explosive growth of the LAN market and the needs created by it have made it difficult for even the largest suppliers to develop resources quickly enough to keep pace with market demands. Novell has found it necessary to establish partnerships with other vendors of LAN products.

The TCP/IP Gateway for NetWare device ($3,995) allows any Novell Advanced NetWare V2.1 file server to serve as a gateway connecting networked PCs to any combination of PCs, UNIX workstations, DEC VAXs or other TCP/IP compliant hosts.

The gateway offering provides services to each networked PC, including the full complement of TCP/IP utilities and TELNET functions for terminal emulation. The TCP/IP Gateway for NetWare permits partitioning of large networks into multiple subnets that can share a common internet address.

In addition, remote execution of commands and/or programs is available for UNIX-based hosts.

Crowe, Chizek Transports MCBA Software To HP 9000 UNIX

Will Provide Software Support, Marketing

Crowe, Chizek and Company, an Indianapolis accounting firm, has announced the porting of the MCBA Accounting, Distribution and Manufacturing modules to the HP 9000 family of UNIX computers.

Crowe, Chizek and Company will provide software support and marketing for the 9000 software product.

MCBA's integrated software is a highly adaptable, multicompany system that's successfully being used in a variety of environments. Although MCBA's accounting, distribution and manufacturing software work together as a fully integrated system, they generally can be installed in a variety of sequences or combinations. In this way, users can get exactly the capabilities as needed and expand their system as desired.

SATCOM Acquires HP Software Business From McCormack & Dodge

To Market Financial Products

SATCOM (Virgina Beach, VA) recently acquired the Hewlett-Packard software business from McCormack & Dodge.

Under the terms of the agreement, SATCOM has acquired rights to mark McCormack & Dodge's HP packages for the plus versions of General Ledger, Accounts Payable, Fixed Assets and Purchase Orders. The agreement also includes the assignment of the McCormack & Dodge domestic and international customers having licensed the HP version of the software.

SATCOM will migrate the acquired software to the new 9XX series of HP computers. The company will market and service these products worldwide.

SATCOM is an independent software firm specializing in the development of manufacturing, distribution, maintenance and health-care applications for Hewlett-Packard's line of business computers.

Informix Develops OA Products For X Window System

Follows Joint Agreement With Sun

Informix Software Inc. has announced the development of office automation (OA) software products for the X Window System operating environment. The X Window System, developed by the Massachusetts Institute of Technology, is a graphical-based windowing environment that provides true multitasking for 16- and 32-bit based systems.

Over a dozen major hardware manufacturers have announced support for the X Window System including Hewlett-Packard, DEC and Apollo.

Informix also recently announced its joint agreement with Sun Microsystems Inc. to develop applications software for the Sun platform of graphic workstations. Informix also has developed Wingz, a "WYSIWYG integrated spreadsheet" for the Apple Macintosh and A/UX. Wingz will be released the second quarter of 1988.

Informix Software designs, develops, markets and supports high-performance integrated OA software including word processing, spreadsheet and novice-user DBMS packages. ■

Here are a few plugs for our new software



Making Ends Meet
At Equinox we know how difficult it is to get all your PCs under control. We know you need a reliable, secure network that's easy to install and manage. One that lets PC users exchange information with your mainframe and each other, and allows printers and modems to be easily shared by everyone. A network that won't blow your budget sky-high.

Presenting SwitchLAN
SwitchLAN is an integrated pop-up PC communications program. It provides "hot-key" micro-to-mainframe access, PC-to-PC file transfers and printer management with Equinox Data PBXs. SwitchLAN was designed for organizations that don't require the multi-user features of PC LANs but do want the efficiency and cost savings offered by PC networking.

SwitchLAN's extensive help and pull-down menus guide even the most basic PC users through file transfer, host access and printer operations. People don't have to become network gurus to use it.

The "Switch" in SwitchLAN
An Equinox Data PBX is SwitchLAN's network hub. All connections are made using telephone type twisted-pair wiring and the serial "com" port already in your PCs. You don't need to buy network servers, install expensive network boards in every PC, or struggle with coax cable.

SwitchLAN and an Equinox Data PBX put an end to "Sneakernet", simply and at a fraction of the cost of other approaches, so you can afford to network all your PCs for what you might otherwise spend on just one department.

Don't take our word for it. Plug a free SwitchLAN demo disk in your PC and see for yourself how simple and capable it is.

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NEW PRODUCTS

Cognos Enhances PowerHouse Architect

Cognos Incorporated has announced the release of a new version of PowerHouse Architect, the prototype-generating option to the advanced application development language, PowerHouse.

The Architect is a screen-driven option for the HP 3000 version of PowerHouse that automates data dictionary creation and maintenance, generates prototypes and automatically documents programs and systems.

Architect 5.01.F incorporates the ability to handle multiple applications. This feature allows data definitions and programs to be standardized across applications.

With Version 5.01.F, users no longer need to set database capacities prior to loading a dictionary or IMAGE root file. The product scans the file to be loaded, sets the database capacity and loads the file. In addition, the Architect automatically restructures fields in full datasets.

This version also allows users to identify non-PowerHouse programs in the program source file directory. The information is picked up by the Architect's application documenter and listed under the heading "External Programs."

Also, the application documenter now writes program descriptions in the user's choice of English, French or German. The documenter offers three documentation levels and can print documentation one chapter at a time.

Contact Cognos Inc., P.O. Box 9707, 3755 Riverside Dr., Ottawa, Ontario K1G 3Z4 Canada; (613) 738-1440.

Circle 400 on reader card

Computech Offers Options For Line Printers

Computech Systems Corporation has brought a new choice for line printers to the HP market by adding an HP-IB interface to the Mannesmann-Tally (MT) 600 Series printers.

The MT 600 Series has set a standard in the DEC market and now is available to HP users for the first time because of Computech's proprietary HP-IB interface.

Available in two models, the MT 600 Series includes the MT 600, a 600-LPM printer, and the MT 690, a 900-LPM printer. In uppercase only, the printers are rated at 800 and 1200 LPM respectively, and are equivalent to HP's 256x Series printers. Line drawing, graphics (including industrial graphics), and other character-set options are all standard features.

Contact Computech Systems Corp., 2635 151st Pl., N.E., Redmond, WA 98052; (206) 883-4107.

Circle 399 on reader card

Multi-CAD Offers Mainframe Interfacing

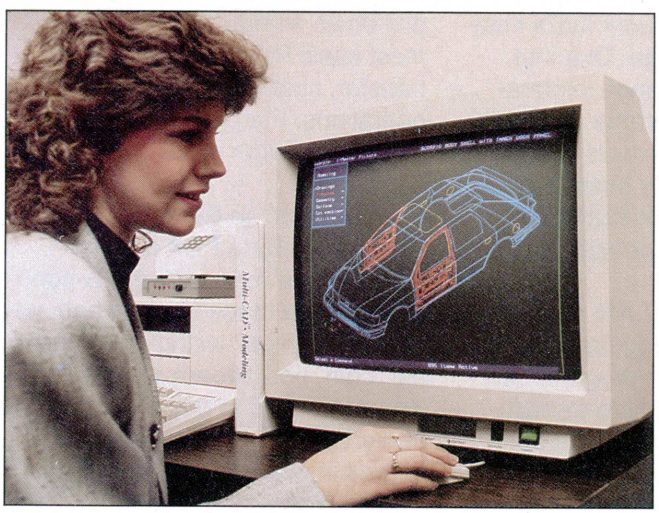
Xysys International has introduced a CAD-Access product, Multi-CAD, a three-dimensional computer-aided design (CAD) software for IBM-compatible PCs. Multi-CAD offers fast data interchange with a variety of mainframe CAD/CAM/CAE systems.

Multi-CAD uses the company's CAD-Access techniques to transfer data to and from Prime PDGS and Medusa, Computervision CADDS4XX systems, IBM's CADAM, GE's Calma, McAuto's UNIGRAPHICS and General Motors' CGS system. The package is targeted at companies with mainframe CAD/CAM/CAE systems that want to add cost-effective seats, and to companies not presently using CAD/CAM/CAE that need to interface with customers or suppliers having mainframe systems.

Multi-CAD supports five types of splines: Linear, Quadratic, Bezier, Hermite and B-spline. Thus, the user can create or access a model using the same type of spline as the mainframe system he wishes to interface with. Multi-CAD can convert from one type of spline to another, although manual touch-up may be required.

Multi-CAD supports both the picture and the layer or level concept of organizing data.

It is available in three configurations,



Multi-CAD from Xysys International uses CAD-Access techniques to transfer data to and from mainframe CAD/CAM/CAE systems.

Mark-up, Detailer and Designer.

The program requires an IBM PC-AT or compatible, or 386s with at least 640K RAM and a PGA or VGA/EGA graphics card and monitor, and math coprocessor. It also runs on PC networks and UNIX workstations.

Contact Xysys International Inc., 315 E. Eisenhower Pkwy., Suite 304, Ann Arbor, MI 48108; (313) 663-5272.

Circle 392 on reader card

CCWORD Runs On HP 1000

Interactive Computer Technology has introduced the CCWORD text and graphics processor, a softkey-driven word processor with the ability to intermix graphic images with text, for use on the HP 1000.

In normal interactive use, CCWORD receives and examines every terminal keystroke, including cursor keys and softkeys. Therefore, it knows exactly how the screen appears at all times, and gives multiple HP 1000 users the ability to process text and graphics as if each were on his own PC.

Graphics images may come from any graphics source, including GRAFIT, DRAWIT, CPLOT and more.

Contact Don Wright, Interactive Computer Technology, 2069 Lake Elmo Ave. N., Lake Elmo, MN 55042; (612) 770-3728.

Circle 398 on reader card

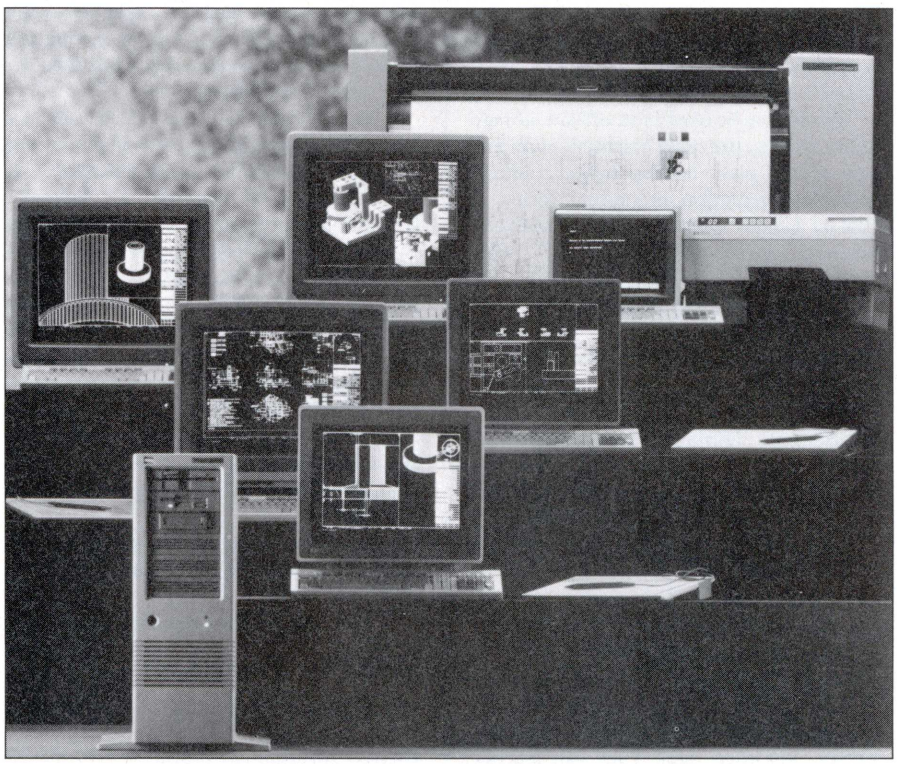
HP Offers MS-DOS Support For ME Series CAD Family

The HP ME Series 10, Hewlett-Packard's 2-D design and drafting package, now is available on the Vectra RS/20 80386-based PC using MS-DOS.

The new hardware platform complements existing support of the HP 9000 engineering workstations using HP-UX. HP ME Series 10 was introduced in 1985.

The ability to offer such workstation-based software on PCs is due to the emergence of the 32-bit HP Vectra RS/20 PC combined with MS-DOS extenders. The HP ME Series 10 on the HP Vectra PC provides the same functionality and performance as on a workstation.

The HP ME Series 10 MS-DOS version ($25,000 with HP Vectra RS/20 and high-resolution graphics) provides user interface specifically designed for mechanical engineers; model-oriented data structure for complete design description; large-drawing handling with up to 15 MB of RAM; and full capability (user interface, functionality, data links to FEA and NC) of the HP ME Series 10 HP-UX version.



HP's ME Series 10 2-D design and drafting system, introduced in 1985, now runs on the Vectra RS 16/20 80386-based PCs using MS-DOS.

The selection of the HP-UX or MS-DOS versions of HP ME Series 10 depends on the working environment. HP-UX offers access to a range of other engineering applications. MS-DOS supports many types of office automation software such as spreadsheets, project planning and desktop publishing systems.

When the need for a distributed network of workstations and PCs exists, HP 9000 and HP Vectra RS/20 computers can be interconnected on a local area network. Data can be shared between HP-UX and MS-DOS systems.

Contact the Hewlett-Packard sales office listed in the white pages of your telephone directory.

Circle 395 on reader card

Leader Offers Disaster Recovery

Leader Data Processing has developed a variety of disaster recovery services to provide HP 3000 users with a method of insuring against data loss and disruption of business in the event of a disaster.

Before a disaster occurs, Leader will assist in improving a company's existing plan or in developing a new one. The company comes on site to conduct an extensive study of the facility, resulting in a detailed, comprehensive plan.

Should a disaster strike, Leader provides a hot-site backup facility with two system configurations for exclusive use during prespecified processing windows. Peripheral devices are provided to match particular requirements.

Leader's services include a cold-site capability by providing an environmentally controlled computer room area (conforming

with HP specifications) for a user to reconstruct his computer system.

As a basic part of all agreements, Leader will schedule a hot-site system to completely test a disaster recovery plan. Such a test confirms that planning is complete and provides a practical drill that assures all personnel and procedures work smoothly to ensure a rapid, controlled recovery.

Leader can be used as an off-site storage facility for disaster-plan essentials such as a copy of the plan, backup tapes, coldload tapes, documentation and special forms.
Contact Leader Data Processing, Valmont Industrial Park, P.O. Box "O," West Hazelton, PA 18201; (717) 455-8511.

Circle 397 on reader card

HP EDIF 2 0 0 Provides Schematic Interfacing

HP's recently announced bidirectional HP EDIF 2 0 0 interface allows users to transfer electronic schematics and symbols between the HP Electronic Design System and other CAE systems that read and/or write the EDIF 2 0 0 schematic-view format.

Although other CAE vendors have introduced EDIF (electronic-design interchange format) products, HP is the first to introduce a schematic-view interface based on EDIF 2 0 0.

The EDIF product gives users greater control over their data. They can migrate symbols and designs between the HP Electronic Design System and other CAE systems that are compatible with the EDIF 2 0 0 schematic view with little or no manual modification of schematic data.

EDIF helps ASIC vendors and their customers reduce design errors and save time in symbol support. With EDIF 2 0 0 schematic view, ASIC vendors can supply libraries and accept information about the finished design in a standard format. Without an EDIF interface, each CAE vendor must create a different set of symbol libraries for different ASIC manufacturers.
Contact the Hewlett-Packard sales office listed in the white pages of your telephone directory.

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GA300, DSP300 Increase HP 9000 200/300 Speed

Infotek Systems will market a new graphics accelerator system, the GA300, and the DSP300 board upon which the accelerator is based. The new products operate with HP 9000 Series 200/300 technical workstations to increase the speed at which floating-point operations can be performed, increasing the overall speed of scientific and technical applications.

The GA300 ($2,395) increases the drawing and redrawing speed of graphics-intensive applications, such as computer-aided drafting and design, real-time modeling and animation, by up to 40 times faster than the HP Series 200/300 processor.

The DSP300 board is the only board-level DSP product currently available for the HP 9000 Series 200/300 technical workstations.

The GA300 consists of Infotek's DSP300 digital signal processor board, the BC305 BASIC 5.0 compiler and graphics accelerator software. In addition to the GA300 for graphics applications, Infotek plans to supply the DSP300 board, plus software, for applications including fast Fourier transforms (the Infotek FFT300) and array processing (the AP300). Infotek also will supply the DSP300 board as a standalone product. An assembler and a C compiler also will be available to users who want to write custom applications.
Contact Infotek Systems' Marketing Department, 1045 S. East St., Anaheim, CA 92805; (714) 956-9300.

Circle 396 on reader card

HASP+ Provides VAX-to-HP Link

Datanex Incorporated has announced that its Multileaving HASP + communications software, a popular DEC-to-mini/mainframe interface, now offers a PDP-11-, VAX- and MicroVAX-to-HP link.

HASP + will interconnect DEC with an HP 1000 by adding MRJE software, type 1000-91782 A, option 890 and PSI-12043 A interface, and a 3000 with the addition of MRJE software, type-3000-30249 A, option 320 and bisync line controller, type 30251 A.

HASP + resides on VMS or RSX on the DEC side and runs off standard DEC interface hardware. It also enables the VAX or MicroVAX to operate as a mainframe, and the HP as a remote workstation. With this option, batch jobs can be submitted to the VAX for processing with job output automatically returned to the submitting system.
Contact Datanex Inc., Box 1728, Eugene, OR 97440; (503) 687-2520.

Circle 391 on reader card

HP, Insight Offer HPGL Printer/Plotter Capabilities

Hewlett-Packard now offers users of its LaserJet, PaintJet, QuietJet, ThinkJet and DeskJet printers compatibility with its HPGL graphics language through printer translation software designed and manufactured by Insight Development Corporation (Moraga, CA).

Insight's LaserPlotter, JetPlotter, MatrixPlotter and DeskPlotter products allow applications requiring plotters for output to use the HP printer line. The software is produced and offered by Insight Development and is available through HP's direct marketing division, Micro-D and other dealers worldwide.

Insight Development Corporation specializes in translation software for raster-based imaging devices. Its printer utility packages provide IBM and compatible PC users with convenience and increased features on many popular printers. Insight also provides special adaptations of its software packages to printer manufacturers and system OEMs.
Contact Insight Development Corp., 1024 Country Club Dr., Suite 140, Moraga, CA 94556; (415) 376-9451.

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HI-COMP Releases Remote Backup

HI-COMP International, an international supplier of performance software products for the HP 3000 environment, has announced that Version 5.2 of HIBACK/3000 includes the capability to perform HIBACK/3000 STORE and RESTORE functions between remote systems, over networks.

DS and LAN networks are supported and integrated so that all of the features that HIBACK/3000 provides for use on local systems are available over networks.

The DS LAN network support feature will allow HP 3000 users who have a distributed environment to implement a centralized backup strategy, which utilizes totally unattended backup to remote disc, backup to remote tapes and restore from remote devices.

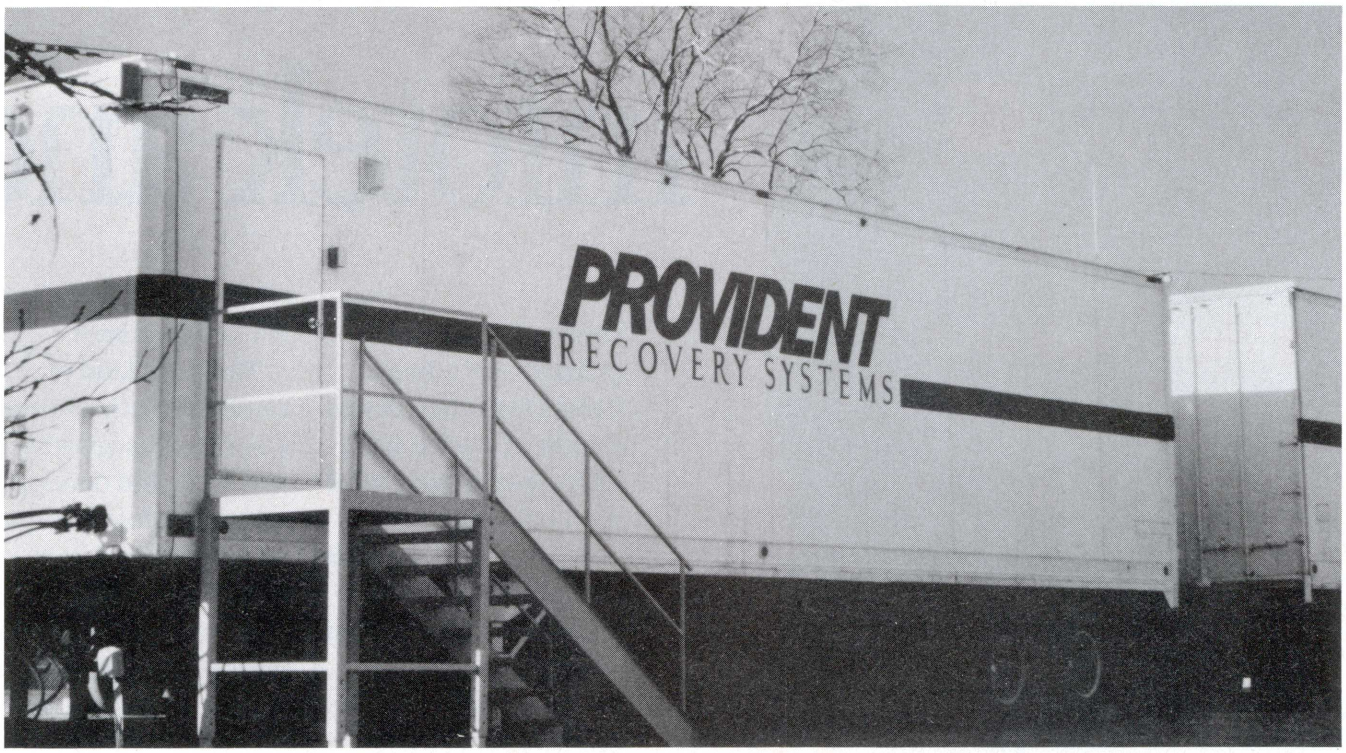
HIBACK/3000 is an alternative backup product that supports all HP peripherals and supplies capabilities for totally unattended backup to system freespace, shared database access during backup and high-density data compression for backup and network data transfer.
Contact HI-COMP Intl., Eicheniohweg 24, 2000 Hamburg 60, Vereins-und Westbank BLZ 200 300 00; Telephone (040) 630-4011.

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Continued on page 82.

PROVIDENT RECOVERY SYSTEMS ANNOUNCES PLANS FOR AN

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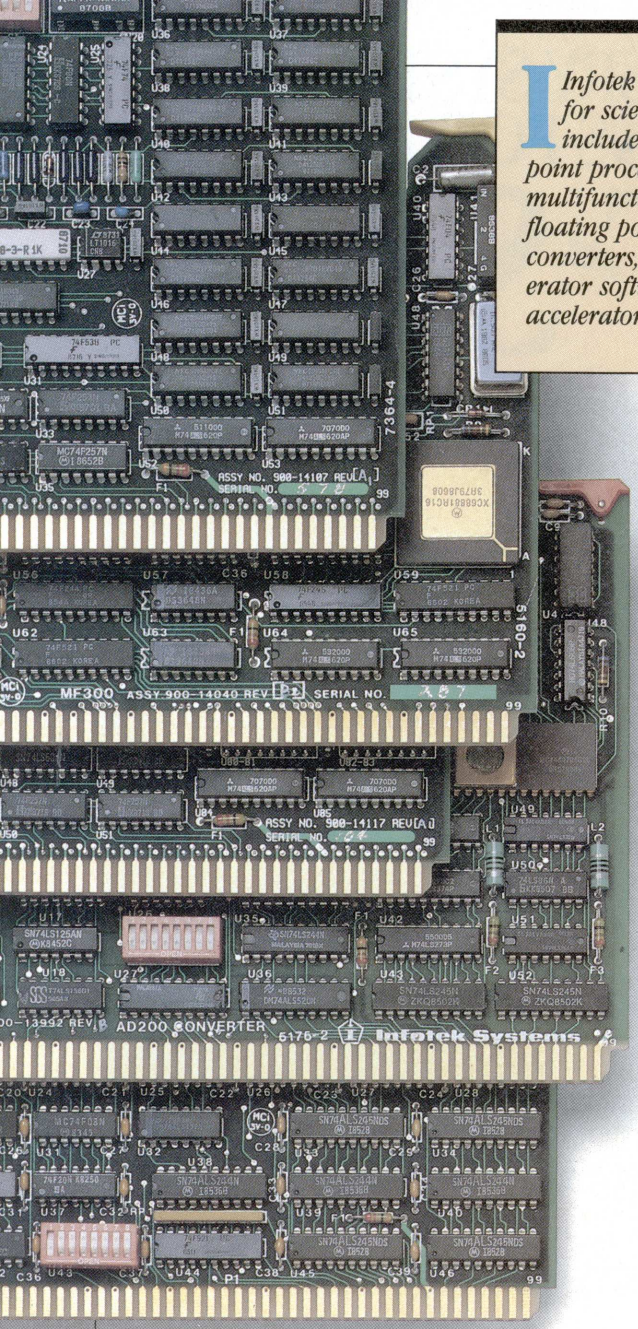
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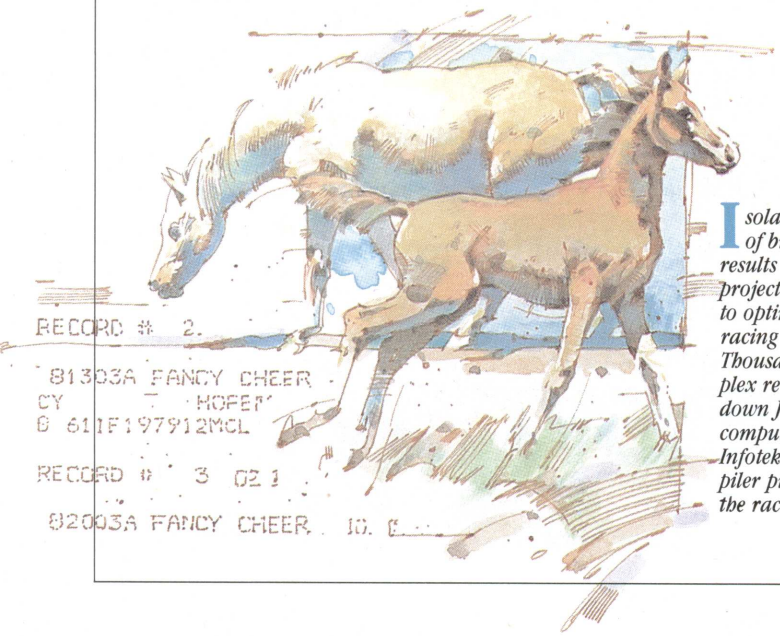
Infotek's full family of enhancements for scientific and engineering computers includes: high-performance floating point processors, memory to eight MBytes, multifunction cards which put memory and floating point in a single slot, A/D and D/A converters, BASIC compilers, matrix accelerator software and a new line of graphics accelerators.



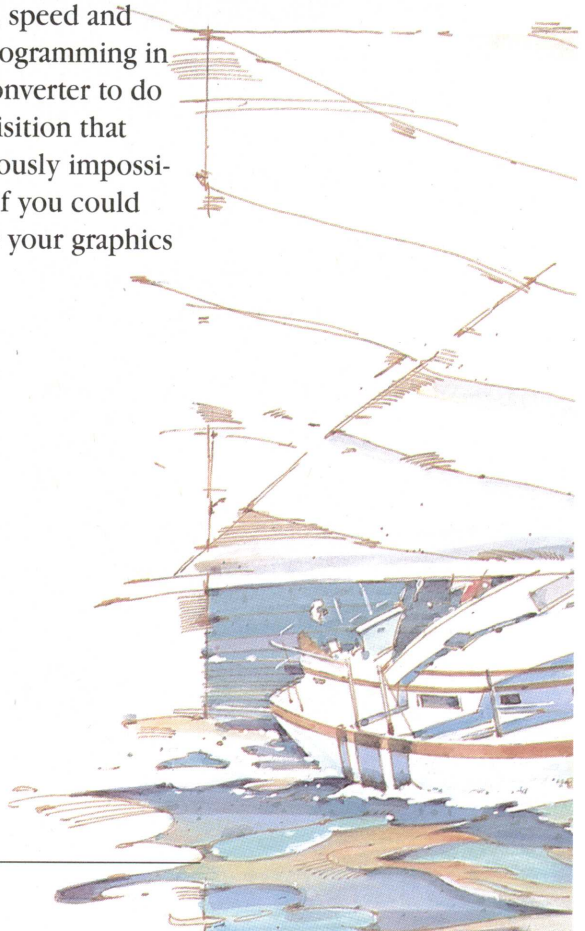
Infotek and

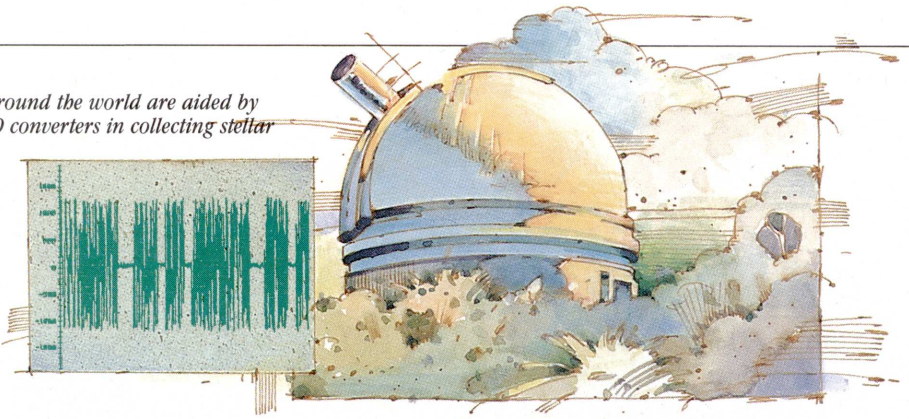
Perhaps you're never going to race a horse, build a log cabin, design a yacht or track a space craft—but imagine what you could do if your technical computer could perform real math or transcendental functions faster—a lot faster!—Or if you could find the precision, speed and ease of programming in an A/D converter to do data acquisition that was previously impossible.—Or if you could accelerate your graphics ten or more times.

That's the kind of capability that has opened a world of imaginative new ideas and developments to Infotek customers worldwide. Users regularly say that "no other product would do the job" until they found Infotek. And that's why



Isolating the effects of breeding on race results is a personal project of John Willey to optimize his horse-racing business. Thousands of complex records bogged down John's technical computer, until an Infotek BASIC compiler put him back in the race.





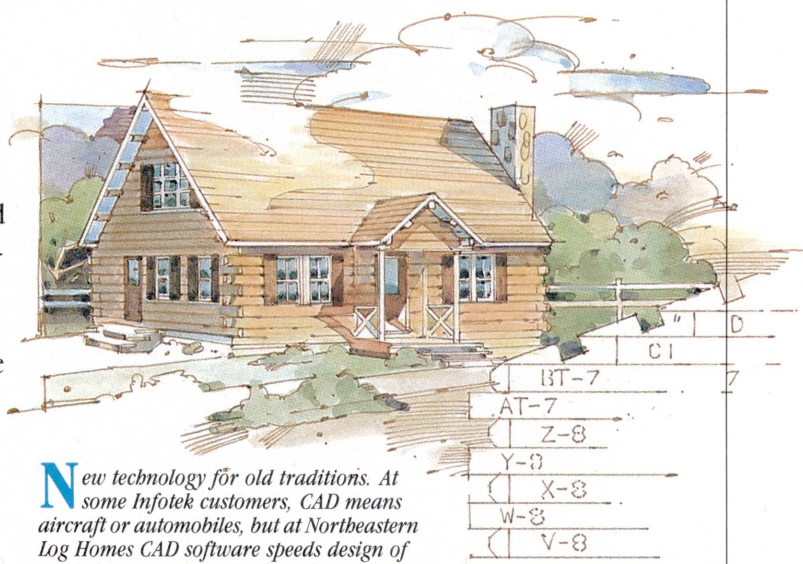
Telescopes around the world are aided by Infotek A/D converters in collecting stellar images to infer atmospheric distortions. No other converters offer the required linearity, speed and ease of programming to reach the stars.

Your Imagination.

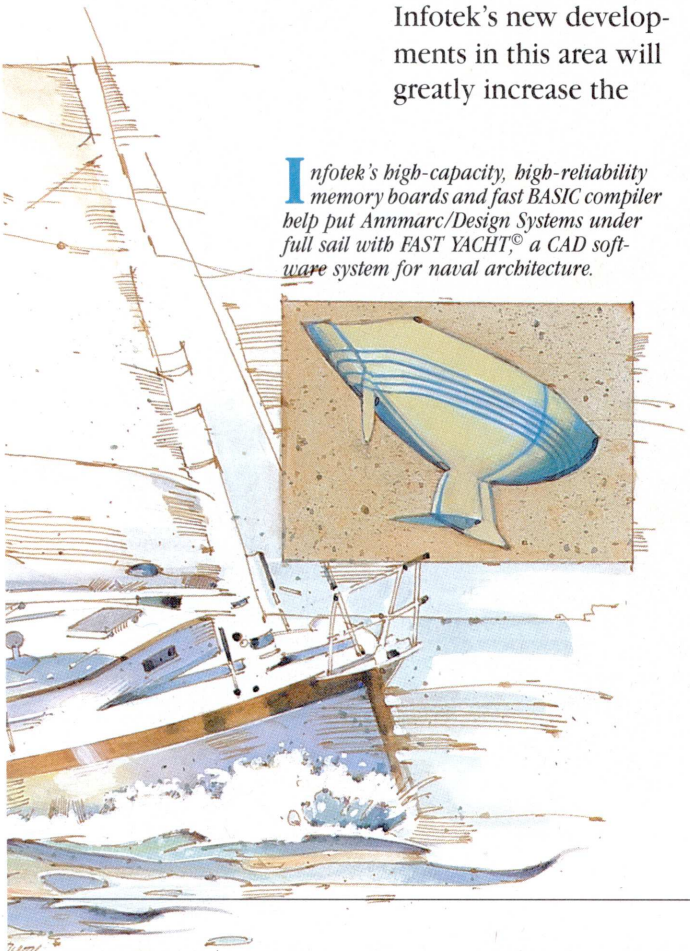
Infotek is considered the world leader in enhancements for HP engineering and scientific computers. In a market where excellence is expected, Infotek stands out for its unparalleled reliability as well as performance—a fact reflected in long warranties and happy customers.

Founded on more than 12 years of advanced R&D in Hewlett-Packard-compatible enhancements, Infotek is today expanding out to include a wider range of technical computers. Many of Infotek's new developments in this area will greatly increase the options for the scientific and engineering computer user. Watch for exciting announcements!

And call today to learn how Infotek products and support can help bring your imagination to life. Infotek Systems, 1045 S. East Street, Anaheim, California 92805-8508, (714) 956-9300, **(800) 227-0218**, in California **(800) 523-1682**, TELEX 678870.



New technology for old traditions. At some Infotek customers, CAD means aircraft or automobiles, but at Northeastern Log Homes CAD software speeds design of cabins and mansions built with pioneering style. Infotek supplied the memory to run the software—"and great service, too!"



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Choosing The Wrong Security Solution Could Cause Serious Problems

Encryption: A Mixed Blessing?

[By Eugene Volokh]

At first glance, encryption programs (several are available on the Contributed Library) seem to be powerful security tools. Encryption is the only fairly foolproof way of protecting data against unauthorized reading, both by outsiders and insiders. Even the system manager, to whom MPE gives unlimited access rights to any file in the system, can't read a personal document that you've encrypted with your own secret key.

In fact, whenever any of our customers called and asked us about read-protecting files, we recommended one of the contributed encryption programs. Actually, we first advised them to protect their files with MPE's file security, which worked quite admirably as a defense against anybody except a console operator or system manager. However, if they didn't want even their system manager to be able to read the files (or were afraid that some operator might pick them up off a backup tape), encryption seemed to be the way to go.

Then, in the Spring of 1987, we got a call from one of our users. He had just fired one of his programmers and two days later found that his system was aborting! Sure enough, there was a time bomb in the software (I had to find it in the object code, since he had lost the source code) and I had to defuse it by patching the program file. In fact, I had to come back six months later to defuse yet another

time bomb in the same program and at that time found a third bomb that was set to "explode" a month later.

Shortly after I got rid of the first time bomb, he called me again. Apparently, some months before being fired, the saboteur had encrypted the source code of another of his systems! Tens of thousands of dollars worth of software now was completely inaccessible, the key known only to the departed programmer.

This, of course, is the "mixed blessing" that I allude to in the title. This company actually had no need for any kind of source code encryption. Although some sites may have a use for encryption (mostly of their data and, say, management memos, letters, etc.), this site did not. Certainly, it derived no benefit from being able to encrypt its source code, since it wasn't in any way secret.

. . . encrypting source files is usually going a bit too far; it's much better to be concerned with things like logon security, embedded passwords, periodic password changes, etc.

In any event, someone must have pulled the encryption program off a Contributed Library tape and our hero decided to "protect" the company's source code. He may have done this maliciously, or he may have been the kind of person who impulsively protects things even though they really require no protection. (Naturally, being the vendors of a security package, we encourage people to "think security." However, encrypting source files is usually going a bit too far; it's much better to be concerned with things like logon security, embedded passwords, periodic password changes, etc.) What matters is that he was gone and the source code was unreadable, which meant, as I mentioned, a loss of tens of thousands of dollars worth of software.

WHEN THE CUSTOMER first mentioned this to us, our first suggestion was, of course, to ask the culprit. Bribe him, threaten him with lawsuit or threaten him with criminal prosecution (the time bomb itself almost certainly was a crime, perhaps a felony). Even if he couldn't get a conviction, he should be able to frighten him into giving the customer the key, which, after all, would be the easiest thing in the world for him.

Unfortunately (I say this because I think the guy should've had the book thrown at him), the company wanted nothing whatsoever to do with the man again. It's a large enterprise with a large enterprise's distaste for negative publicity. Management would rather lose thousands than get involved in a "Goliath vs. David" sort of case where the company (although it is in reality the innocent party) might be portrayed as the big bad guy trying to "get" a poor helpless ex-employee.

Instead, I was asked whether there was anything I could do. At first glance, I thought this was impossible. After all, any good encryption system that uses an encryption key is, theoretically, almost unbreakable. You can try to decrypt the encrypted file, but unless you stumble across the right key, all you'll get is garbage. I'm sure that some National Security Agency cryptographers armed with Crays could do it in a jiffy, but I have neither their hardware nor their sophisticated algorithms (in fact, much advanced cryptography is classified as government secret).

Fortunately, I got an idea. If:

```
SOURCE FILE + KEY yields ENCRYPTED FILE (encryption)
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and:

```
ENCRYPTED FILE + KEY yields SOURCE FILE (decryption)
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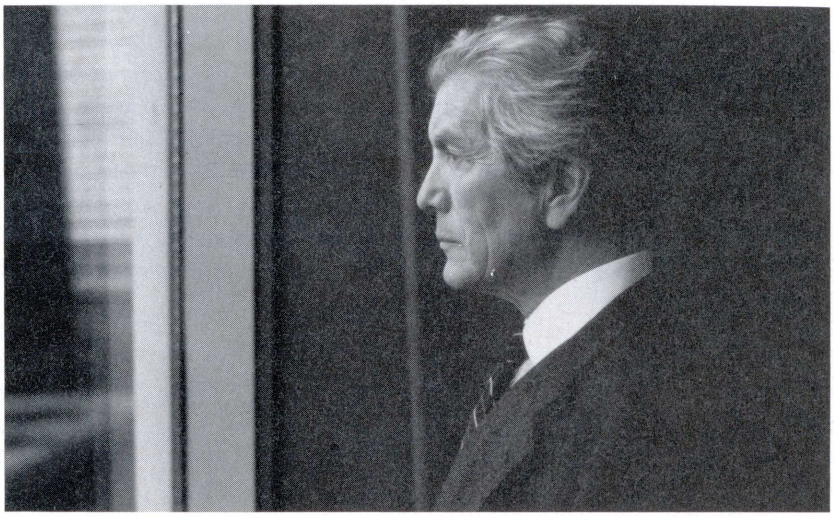
then it stands to reason that:

```
SOURCE FILE + ENCRYPTED FILE yields KEY
```

In other words, if they had an unencrypted copy of one of the encrypted files, with luck I might be able to deduce the key with which the file was encrypted and then decrypt the rest of the files with that key (if they were all encrypted with the same key).

I asked the author of the encryption program for its source code and got to work. A couple of days later (and a couple of thousand dollars later for our client), I worked out a solution. Essentially, I reduced the problem to a system of 64 equations with 64 unknowns, where the operators were Circular Shift and Exclusive OR.

Unfortunately, I knew of no way to solve it algorithmically; instead, I wrote a PASCAL program. This program made assumptions about each unknown (each unknown's value could be 0 or 1, and it made each assumption in turn) until it got enough data to start making deductions. Then it deduced as many values as possible until it either figured every value out (a solution), got a contradiction (in which case it would forget the last assumption it made and assume the opposite), or found that it could make no more deductions (and



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thus had to make some more assumptions).

Finally, after about an hour's computer time, I got 256 possible solutions. Because of the nature of the algorithm, any of them would work to decrypt the files, but only one actually represented a sequence of printable ASCII characters. This turned out to be the key that the culprit actually used.

Curiously enough, the key was the name of the group in which the files were stored. If the customer (or, for that matter, I myself) tried it in the first place, we'd have saved a lot of time. Thus, this case turned out better than expected. The company got its source code back.

> By and large, there's very little data — especially data stored in non-database files — that really needs encrypting.

AT FIRST, WE thought this was an isolated incident. Then, a few months later, I was scanning through a bulletin board when I ran into a message from someone else complaining of exactly the same thing! A programmer had encrypted some files and then left on bad terms. In this case, the company wasn't so lucky (I believe it didn't have any unencrypted source code from which to work out the key). Three months later, we got a call from another person: Exactly the same thing had happened again (again, we couldn't do anything to save their files). Fortunately, this person was going to do something about it — threaten some sort of civil or criminal prosecution.

It appears that misuse of encryption software isn't such a rare circumstance at all. In fact, I suspect that *abuse* of encryption is more frequent than *proper use* (especially if you include the accidental cases in which some over-zealous programmer encrypts his sources and forgets his key). By and large, there's very little data — especially data stored in non-database files — that really needs encrypting. An adequate file security system is usually quite sufficient. Certainly nobody except software suppliers really needs to encrypt source code.

Thus, my recommendation to HP users is: *Don't put file encryption programs on your system unless you're convinced that you have some files you really need to encrypt.*

In other words, don't encrypt just for "general principles." Decide whether you really need to (especially since most valuable data usually is stored in IMAGE databases, which most encryption programs don't handle).

As sometimes happens, what at first glance seems to be a great idea actually can do more harm than good. Security is a very important issue and you should think about it seriously; however, as you see, you could face serious problems if you choose the wrong security solution.

What if you've already fallen guilty to a cryptographic saboteur? Trying to decrypt your programs with a method like the one I mentioned should be your last try, not your first. It's quite expensive, time-consuming and uncertain (since if you don't have the *exact* original source code, you're in trouble).

As in all cases of computer crime (or of crime in general), the best solution is to bring in the law. Though I'm certainly not a lawyer, as I see it, you have two possible approaches: the civil and the criminal. You can sue (or, more to the point, threaten to sue if he doesn't give you the key) for damages, alleging that his intentional act (or even his negligence) has deprived you of the use of your software; or you can try to prosecute on some sort of criminal sabotage charge, again alleging that the person intentionally acted to deprive you of what was rightfully yours.

I've heard different opinions on the criminal matter. A policeman experienced in computer crime investigation mentioned that it may be impossible to prosecute unless you can prove that the initial encryption was malicious. If the person claims that he encrypted the software legitimately out of a desire to "secure" his employer's system, it may be very hard to prove otherwise, even if he refuses to decrypt the software after he's fired.

On the other hand, a computer lawyer I talked to said that prosecution may not be that difficult. You should get in touch with your police department to find out (many big police departments by now have a lot of experience in computer crime investigation).

IN ANY CASE, the mere threat of criminal or even civil prosecution can make the culprit come around. After all, all he needs to do is tell you the key (unless he's forgotten it) and he's off the hook. Even if he thinks he'd win in a legal case in the long run, I strongly doubt that he'd be willing to chance it.

Furthermore, by taking stern action against this sort of computer crime, you'll be preventing such things in the future, both on the part of the particular wrongdoer involved and by any of your other employees. Just like drunk driving and shoplifting a decade or two ago, many people see computer crime (especially sabotage) as nothing really serious, just a "harmless prank" or a test of programmer skill. It's time this attitude changed, and changed radically. *—Eugene Volokh is president of Vesoft, Los Angeles, CA.*

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Disaster Planning

Preventing A Catastrophe

[By James R. Leverentz]

For the past 10 years, disaster planning has been on the minds of data processing professionals, as well as those associated with the field of information processing. What is a disaster? A disaster is any situation for which we aren't prepared, the unforeseen. How do we plan for the unforeseen? We can't! At best, we can know what to do when it happens. If there's no plan of action, disaster will turn into catastrophe.

The object of disaster planning is to develop a plan of action which, regardless of any event, will avoid catastrophe, limit damage and allow us to continue to operate under a contingency plan.

What are the alternatives available and what drawbacks may they have? We'll start with *hind site*. *Hind site* is the luxury of looking back on a situation and saying, "Oh well, if I would have . . . " From a business perspective, especially in competitive industry, there are no such luxuries. As a business entity, we can expect only one chance. So, we look for ways to insure that, when disaster befalls us, we can pick up the pieces and start over. Remember how much work it was to get where you are now? Do you really want to start over? What are the options?

Mutual Site Agreement

THE MOST COMMON plan is a *mutual site agreement*, usually a handshake between DP managers. Few corporations allow second- or third-level management to form binding contracts on a handshake. There are very few sites with sufficient excess capacity to operate a second business without curtailing their own operations.

No CEO is going to allow his business to fall behind to allow another company to use his hardware. Even if the supporting site could eliminate all "non-essential" processing, how would the "non-essential users" feel? Further, the most critical phase of disaster planning is testing, the step most commonly omitted from mutual

agreements. For these agreements to work, companies would have to have far more computer capacity than their business requires. If this were true, Hewlett-Packard wouldn't be selling system upgrades.

THE COLD SITE is another operation, an alternate available location without equipment. *Cold sites* bring up the term *allowable downtime*. How long can a business exist without access to its data? How long will it take to "warm up" a *cold site*? Is it conceivable that a hardware configuration sufficient to support operations can be delivered, installed and made operational within the *allowable downtime*? An open purchase order with a vendor for delivery of a complete configuration only guarantees purchase of the equipment, not that it will be there when needed. The *cold site* provides a place to put a computer we don't have.

Another option is a *remote site*. It depends on the miracle of modern telecommunications. Not all problems with telecommunications can be blamed on the utilities, although many so-called experts try to do that.

The number of external forces working against our ability to exchange information are staggering: weather, traffic accidents, power failures and load-switching to mention a few. These all play a part. Anyone who has a telephone-based network certainly has heard his utility company say, "It's not us, it must be your hardware," and the hardware supplier say, "It's not us, it must be the computer," and the computer manufacturer say, "The configuration is fine, better call your utility company," and so on.

How about the in-house *hot site*, a dedicated computer solely available for disaster recovery? It's a good idea at first, but then it starts being used for program development (so it's not a waste of money). Development turns into production use. Suddenly it's no longer dedicated to disaster recovery. You've become a multiCPU user and compounded your recovery problem. Further, unless your *hot site* is in another location, it's subject to the same disaster affecting the primary machine.

Consideration of a *mobile site* brings up *allowable downtime* again. A lot of computing power can be put in the back of a truck, but how soon can you get it where it's needed? At what cost?

So, assuming you've solved the hardware problem, what about your users? Another crucial element of a disaster plan is where they will work, at what times and how they'll get there. Your users may not be able to take their usual bus, carpool, public transportation or the like to your planned site. A workable disaster recovery plan requires not only hardware to continue your operations, but a transferable set of software and users.

Hewlett-Packard has provided us with computing hardware compatibility unsurpassed in the industry — an interchangeable operating system. For the most part, any software will run on any machine. We can prove it works with only two MPE commands, RESTORE and RUN.

Is that the extent of the plan? No. We still must consider the people. If a business suffers a disaster situation that deprives it of its computer hardware, this same situation will deprive people of a place to work. No work, no data, no data processing.



How can we be sure that when people are removed from their familiar setting they'll be able to perform their duties? What happens when those little-known ifs, ands and buts that were noted on slips of paper in the billing clerk's desk burn in the fire? Who are the key people in the information flow? They know who they are, you probably know who they are,

but how many of you have assumed responsibilities from necessity and your direct supervisors are unaware of it?

The relationships between people and their work are the same as the relationships between hardware and software and between software applications. The interchange of information is either independent, dependent or related. Knowing how the hardware and software relate to each other is critical to contingency planning, but just as important is knowing how the people relate to the work to be performed. This is the mechanics of operation, the manual process required to support the electrical process. The only way to define the intricate mixture of people, software and hardware is through *Information Processing Audits*, therefore a critical part of any disaster recovery plan.

Auditing the flow of information through a business is different from a normal financial audit. The basic DP audit (as a part of the annual finance audit) consists of, "Where did it go in and what did it look like when it came out?" This tells us our software is working, but not *why* it's working. We need to know every aspect of data flow if we're to move our operations to a new location without interrupting the flow. For years, auditors have described how reckless we are with backup storage, security and documentation. However, they rarely tell us what to do about it, or even where to begin.

What should the approach to auditing and contingency planning be? Ask yourself, "What's wrong with the existing methods of preparing for a disaster?" The answer is simple. We write up a set of procedures, document systems, define requirements, ignore the users, put it on a shelf and never look at it again. For a contingency plan to work, the auditing document must become a useful tool, something that will be a part of our daily operations and decision making. If it's used daily, it will be updated. Having current information is the only way any contingency plan can work.

An unproven plan is as good as no plan. Most companies that say they have a plan have never tested it. They may have loaded software and data on different hardware, but very few have ever tried to do a day's work at a new location on four hours' notice. A little planning isn't necessarily better than none. It only creates a false sense of security.

Preparation for the unforeseen must begin with *fore site*: comprehensive auditing, followed by thorough testing. These two steps then must result in a binding contract. If we're to protect our business and ourselves against catastrophe and limit disaster, our data must be sound, our plan current and our resources assured. Anything less is little more than shop talk among friends. *—James R. Leverantz is president of On-Site/Off-Site Inc., Niagara Falls, NY.*

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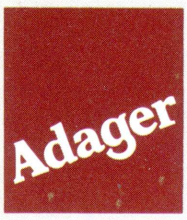
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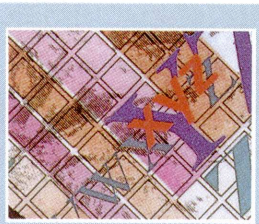
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UNIFYING THE ARCHITECTURE

How Cognos Makes The Choice Of HP Computer Or Operating System Transparent To *PowerHouse* Users



SOFTWARE

Carl B. Marbach

A theme that regular readers of *HP PROFESSIONAL* have detected is that we believe computer architectures should become more and more alike when viewed by an application. The platforms may differ to allow special features of the hardware to be exploited, for instance, the specialized graphics capability of a PC or 9000 workstation, but the underlying architecture should be transparent to the developer.

The HP world has been split artificially into the technical and commercial computing areas. HP computing platforms support MPE, HP-UX (UNIX) and MS-DOS. Programmers and system planners are forced to consider all three because of the special features each system can provide end users. Until now, technical users have run on HP-UX and commercial users on MPE. MS-DOS has supported PC applications.

Cognos Corporation of Ottawa, Canada, and Peabody, Massachusetts, producer of *PowerHouse* application development and data management software, has a large installed base on HP 3000 MPE machines including the new precision architecture Spectrum computers.

Earlier this year, Cognos announced and delivered a PC-based version of *PowerHouse* and also announced that *PowerHouse* will be available for HP-UX, which is used on most HP technical computers. At the end of 1987, Cognos had over 7,200 products licensed for use.

The availability of a fourth-generation language (4GL) on all three architectures is unique in the HP marketplace. Developers who build applications using *PowerHouse* are removed from the constraint of deciding which machine they will run on because the *PowerHouse*-developed code will execute on all three. Applications developed on a Vectra will run on an HP 3000 running MPE or on an HP 9000 utilizing HP-UX.

How It Was Done

A few years ago, *PowerHouse* was heavily dependent on MPE and HP 3000 architecture. When the Spectrum precision architecture machines were announced, the developers at Cognos realized they would have to recode *PowerHouse* so it could run on the new 32-bit computers.

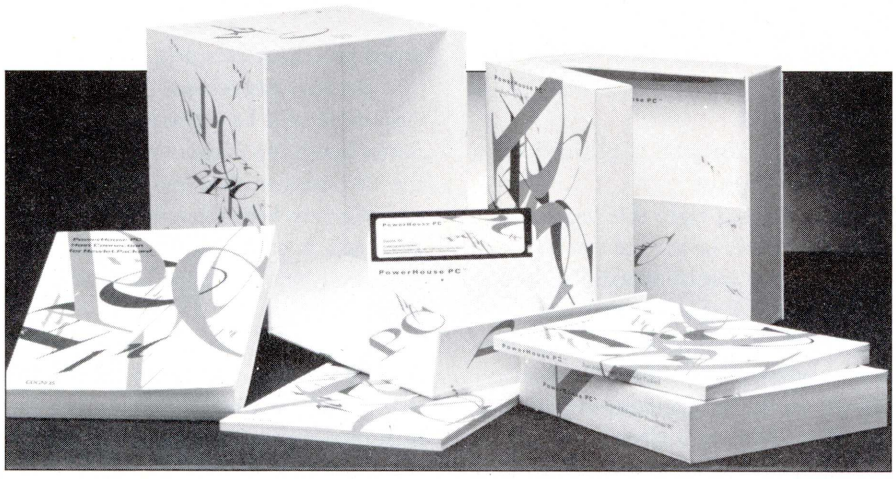
PowerHouse was programmed in SPL, "With a conversion to C in mind," says Jim Sinclair, manager of information technology at Cognos.

Cognos had built an SPL-to-C translator that was used to port the more than 270,000 lines of code from one language to the other.

Now that the C programming language was at the heart of *PowerHouse*, it could be compiled on any machine with a C compiler. There still would be machine-specific modules for each computer, but the main code could be kept machine-independent. The wisdom in this design can be seen by the three differing computers *PowerHouse* now runs on in the HP family.

PowerHouse also is available on DEC VAX and Data General Computers. Because HP-UX is a version of AT&T's UNIX, it reasonably can be expected that *PowerHouse* eventually will appear on most UNIX computers that meet the UNIX standard.

An advantage of *PowerHouse* is that it uses the underlying file management system of the host computer. So, while it might use IMAGE on the HP 3000 (TurboIMAGE on the Spectrum), it uses something different on the HP-UX versions — CISAM now and relational support due next release.



Now users can run full **PowerHouse** *applications on their PCs.*

Through the software, these differences are invisible to the application builder. By using the computer's own file system, Cognos has relieved itself of the necessity to optimize each version of the system based on the software architecture. By using the underlying file structures, Cognos can allow the operating system to do its job optimizing for the particular hardware it is running on.

HP 3000 Implementation

More *PowerHouse* systems exist in the HP 3000 environment than any other, with the total number of licenses exceeding 5,000.

In addition to its own dictionary, *PowerHouse* supports DICTIONARY/V from Hewlett-Packard. In addition, in the 3000 environment, Cognos offers other complementary products. The *EXPERT* allows end users to build their own customized reports. *POWERPLAN* is a financial planning and analysis tool. *MULTIVIEW* is a complete financial package, written in the *PowerHouse* language, which includes general ledger, accounts receivable and accounts payable.

Because *MULTIVIEW* is written in *PowerHouse*, it has a commonality with other user-written *PowerHouse* applications, which give a unified "look and feel" to both the user programs and the financial package.

All implementations of *PowerHouse* are organized into several modular programs. *PhD*, *PowerHouse Dictionary*, defines the data for a given application. The centralization of the data definition allows for easy modification and control of the data structures without changing the programs that use the data.

QUICK controls interactive screens and menus that can run operating system commands or other programs. It was designed for business transactions, like order entry, that combine multiple forms and files.

QUIZ is an interactive or batch mode reporting module that can produce complex reports with simple queries. *QTP* allows large updates to the data files that are common to month-end or year-end processing.

Using these modules, the application developer has the full use of the *PowerHouse* functionality. There are minor differences between the operating systems, and some functionality has been added to the MPE version (like *MULTIVIEW*) because it has the largest

FIGURE 1

***PowerHouse* Features**

HP Models Supported	■ All HP 3000s running under MPE ■ All HP 3000 Series 900s under MPE XL	■ Vectra or IBM PC AT and 100% compatibles under MS-DOS ■ HP 9000 Series 800 under HP-UX
File Systems Supported	■ IMAGE/TurboIMAGE ■ KSAM ■ MPE (RIO, MSG, CIR)	■ *PowerHouse* subfiles (self-describing) ■ DIF files in *PowerPlan* ■ Figure files written by *PowerHouse* GRAPHICS
Dictionaries Supported	■ Cognos Dictionary (QDD) ■ Dictionary/V (Dictionary/3000)	■ System Dictionary
Terminals Supported	■ Over 175 terminal types supported ■ Block mode or character mode	■ Concurrent line drawing, blinking, underlining, inverse video, halftone, etc. in any screen ■ Up to 10 pages of terminal memory utilization
Audit Trails	■ IMAGE/TurboIMAGE transaction logging ■ *PowerHouse* transaction auditing on all files	■ Automatic transaction rollback on all files ■ Transaction backout capability on all files
Documentation Generated	■ Prototype documentation ■ User documentation ■ System documentation	■ Local language support ■ Program/file/element cross referencing
Languages Supported	■ English, French and German for development	■ English, French, German, Japanese and any other 8-bit ASCII local language in execution

installed base and has been around the longest.

PowerHouse PC

Utilizing the IBM PC AT and full compatibles, *PowerHouse PC* runs on HP's Vectra microcomputers, including the new 286- and 386-based models. Cognos vice president Ron Nordin thinks that developers will be able to do development on less costly workstations for operation later on midrange CPUs. "Customers now will be able to develop and run full *PowerHouse* applications on their PCs. Distributing *PowerHouse* on ATs or compatibles offers tremendous productivity at a significant savings," Nordin adds.

PowerHouse PC runs under MS-DOS and requires 640 KB of memory and about 20 MB of hard disc.

Taking advantage of the PC environment, *PowerHouse PC* uses color, the ability to alter the size and location of subscreens, and scrollable fields. An import/export facility enables users to transport data into and out of other PC programs. There also is a built-in transfer package to allow data to be moved between applications on a minicomputer.

Support for OS/2 is planned for a subsequent release.

Announced early this year, *HP-UX PowerHouse* will be in field test later this summer with release scheduled for late 1988. Mike Laginski, HP products marketing manager at Cognos, sees some commercial customers moving to HP-UX for the standardization UNIX has to offer. "Having a UNIX base allows companies to become more independent with the types of processors they have," he says. The thought is that having UNIX as a company standard will allow easier integration of UNIX workstations and other UNIX computers along with the HP Spectrum midframe.

Cognos has decreed that *PowerHouse* will be source-code compatible between the HP-UX versions and the MPE/XL version except for the specific routines that have to do with the individual operating systems. MPE uses block mode while HP-UX will be character oriented (hear that all you word processor people?).

Because *PowerHouse* is a multiuser system, it will be released for the 800 Series Spectrum computers and not for the 300 Series workstation HP-UX products. Cognos hopes that the HP-UX version will become the forerunner to a standard UNIX version to be announced later.

The underlying file structure that *PowerHouse* will use under HP-UX initially will be CISAM, with plans for relational support to be available for the second release in 1989.

Utilizing the "portable sub file" system in *PowerHouse*, users will be able to transfer databases between MPE and HP-UX computers. While this approach will not allow transparent access across architectures in a network, it will allow MS-DOS, MPE and HP-UX to send and receive data that can be built into a *PowerHouse* database.

One Language, Multiple Systems

Data processing shops have the opportunity to build applications in one development system and then transfer them between most of HP's computer systems. By achieving source-level compatibility (between HP-UX and MPE XL, at least), the task of supporting multiple versions has been kept to a minimum.

Unifying the architecture can take many forms: It can mean one hardware system, or one operating system that spans multiple hardware configurations (like UNIX). In this case, however, it is one application development system that runs on multiple architectures giving a similar "look and feel" to three different HP systems. The advent of the PC has caused other application products to run on a mini or a midi *and* a PC. Now the loop has been extended to include the entire Spectrum line, the HP 3000 with MPE, HP-UX systems (800 Series) and MS-DOS. *PowerHouse* runs on all of these with great compatibility between all three major versions.

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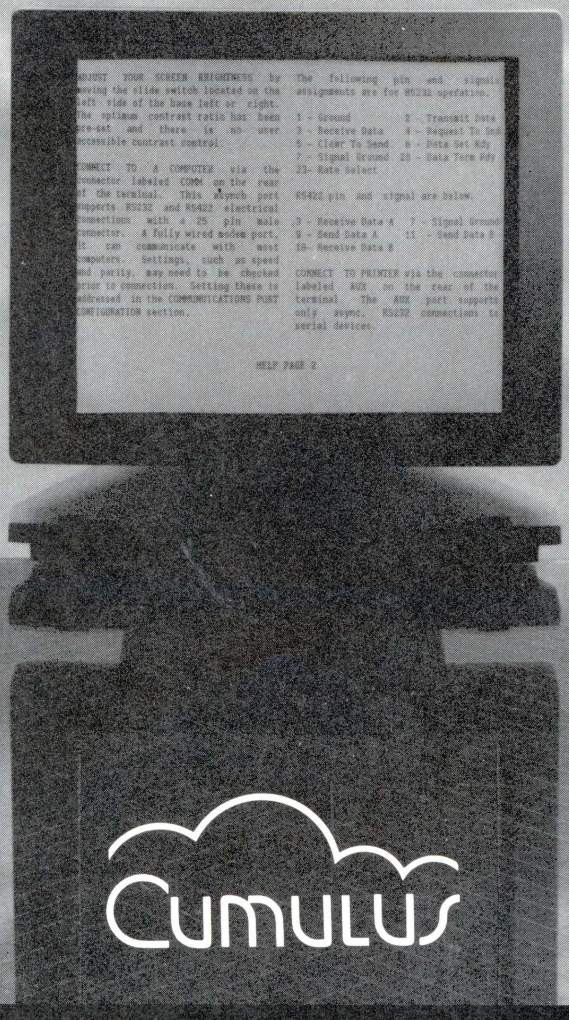
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STRETCHING YOUR DP BUDGET

You Can Learn To Love The Used Equipment Market



USED EQUIPMENT

Buck Buchanan

The market for used HP equipment is maturing to a point that allows an end user to call one broker and buy a ROM for the old 85A he has at home, sell two BACI cards off the 1000F Series in his company's lab, buy a 9888A bus expander and get a quote for a complete Series 70 system for the MIS department. In some cases, the same broker also can supply ATE systems, test equipment, even CNC machine tools and systems made by other manufacturers. Many of these brokers also will provide the ancillary equipment needed for the DP environment, such as power conditioners and air conditioning systems.

Most end users today have become quite comfortable with buying and selling used HP equipment, but a complete understanding of the ground rules is still warranted. Basically, when buying used equipment, you need to be guaranteed that the equipment will arrive in good condition and meet current HP engineering specifications so that it is eligible for inclusion in your maintenance agreement.

Even when buying new equipment, there often are hidden costs to be aware of, including cables, converters, adaptors, site prep charges, installation costs and required additional software (e.g., the software required for the HP 2680A Laser Page Printer with forms design and graphics options). Know exactly what the purchase price covers and, as important, what it does not cover.

Follow this buyer's checklist:

- *Consult your Hewlett-Packard CE to be sure you're aware of everything (including software requirements) that's needed to make the additional equipment fully operational on your current configuration.* Also, ask if there are any potential compatibility problems with earlier (or later) models or revisions. Next, make sure these requirements are clearly outlined in the purchase agreement.
- *Since it is industry practice for the buyer to assume all transportation charges, be sure to specify the mode of shipping and determine the approximate shipping point in order to estimate shipping costs.*
- *Notify the seller of the delivery conditions at your facility* (hours designated for receipt of equipment, narrow doors, stairs, elevators, steps into building, etc.).
- *The purchase agreement should clearly state that the seller guarantees the equipment eligible for Hewlett-Packard maintenance.*
- *Schedule any required site prep, verification and installation well in advance of your target date.*
- *Advise those who will receive the equipment to check for signs of shipping damage and to make the appropriate notations on the Bill of Lading before signing for receipt.* It's also a good idea to write "Mechanical Condition Unknown" before signing.
- *Carefully check the equipment as soon as possible and immediately notify the seller of any problems you encounter.*
- *If the equipment is going overseas, have the power conversion completed by the installing group at its destination, but determine the conversion cost in advance.* A CPU may be very inexpensive, requiring only a fuse change, restrapping the transformer and buying a new power cord, but a laser printer such as an HP 2680A may require changing out all the servo motors at the factory, which can be prohibitively expensive.

Management of used hardware acquisition and disposal by larger companies with multiple sites and/or divisions occasionally becomes incoherent, sometimes even divisive. I've seen equipment bought from one division of the same corporation on a different floor

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in the same building. This is not an isolated occurrence. Similar incidents take place every day. This typically happens between operations at different locations or between divisions using the same peripherals on different series processors that are performing dissimilar functions.

The best solution to this waste is not only developing a holistic approach to company-wide asset management (although that does offer a good start), but flexibility also is a key factor.

DURING A TRANSITIONAL period (merger, acquisition, plant closing, system upgrade or conversion to another product line or manufacturer) it's inevitable that surplus equipment will be generated. There are a number of ways to dispose of this equipment. Auctions seem to work well for personal computers, word processors and cattle. The sale of engineering, technical, scientific and analytical equipment, as well as business systems, CNC-type machine tools and test equipment seem to be best handled through the brokerage market.

In addition to the most common means of disposing of surplus equipment by direct sales to a broker for resale, there are a couple of other ways you can benefit from the services of a broker. When dealing with a large quantity of equipment, or equipment from either a diverse selection of product types and applications or made by several different manufacturers, your best bet is to contract with a broker to sell your equipment on consignment. This brings in greater revenue to the seller and relieves the broker of the cost of interim financing for a direct purchase. It also facilitates your other option, equipment trade.

Trading is particularly advantageous when a division is converting to equipment from another product line or manufacturer. This allows the seller to get greater value for his surplus in the form of needed replacement equipment.

In many cases, when a division sells surplus hardware, the revenue generated by the sale goes into the general fund while the cost of the replacement equipment comes entirely out of the division's budget. An equipment trade may provide a way around this obstacle.

If managed properly, your surplus equipment sales substantially can extend your budget. It pays to establish a working relationship with a broker . . .

The following is a checklist for selling used equipment:

■ *If your equipment is under a maintenance contract and not user-installable, have the deinstallation services performed by the party handling your maintenance.* If your company handles its own maintenance, have your maintenance personnel perform a final PM check and deinstall the equipment. In this case, you should guarantee the purchaser that if it proves ineligible for maintenance, you either will pay for the necessary repairs or refund the purchase price at your option. State clearly on the purchase agreement that the purchaser must have your written permission authorizing the specific charges before any repairs are made.

■ *Have the engineer who will deinstall the equipment pack all the accessories (cables, interfaces, manuals, etc.) with the appropriate machine.* Never lump the accessories together or package them; physically separate them from the machine to which they belong. The individual machines composing your system may be reinstalled at various sites. *Note*: Include backup tapes of the operating system when selling a CPU, and a disc pack and its error-track log with each disc drive sold.

■ *Notify the purchaser of the conditions at the pick-up site* (entry restrictions, hours of operation, stairs, narrow doors, elevators, steps into the building, etc.).

■ *When the carrier arrives to load the equipment, check the bill of lading to be sure he is acting on the purchaser's behalf.* Also, check the bill of lading to be sure all accessories are included. If unrecorded machines or accessories are lost, it may be difficult for you to prove they were included in the shipment.

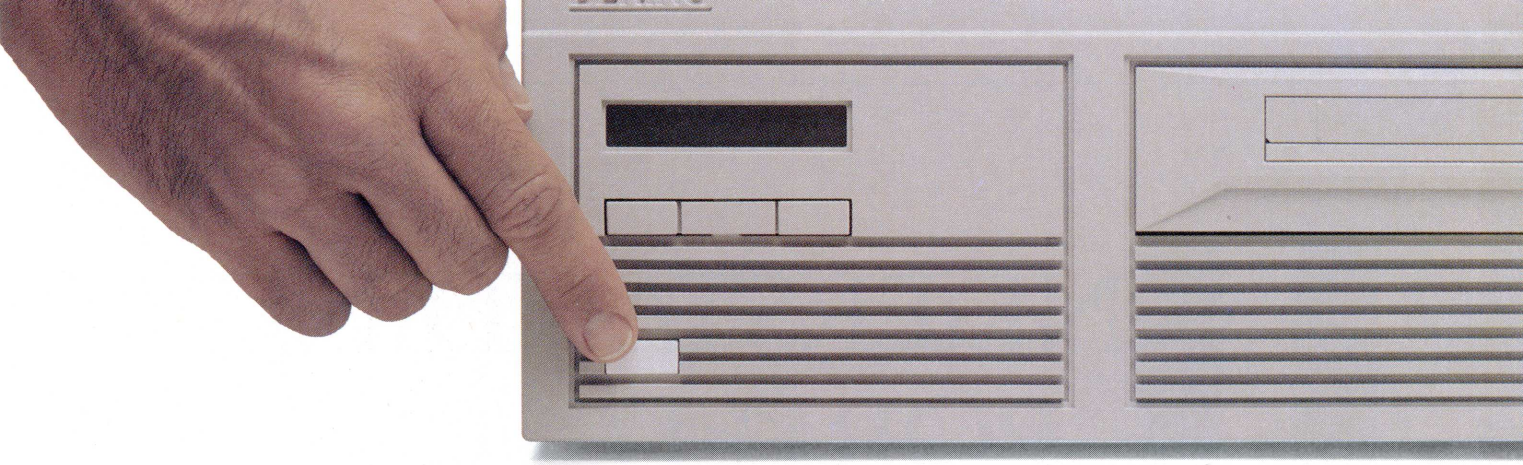
■ *If you are consigning equipment to a broker, have your legal department go over the agreement.* Consigned equipment can be moved to a bonded warehouse and individual items released as they are sold.

In general, the purchaser pays for the deinstallation, transportation to the warehouse and storage charges, if any. The broker is responsible for marketing costs, arranging transportation from the warehouse to the buyer, billing the buyer for the purchase price and shipping costs for transportation from the warehouse to the buyer, furnishing a full accounting of the sale with payment, as well as negotiating any insurance claims or repair costs.

If managed properly, your surplus equipment sales substantially can extend your budget. It pays to establish a working relationship with a broker, not only as a source of equipment, but as a valuable information resource. Brokers spend their days talking to users around the country about their hardware problems and solutions.

As most brokers market throughout the U.S., and many sell around the world as well, finding one you're comfortable with is more important than his office location. Most brokers are experienced with both the equipment and the marketplace, and they like hearing from you. — *Buck Buchanan is a brokerage vice president at Westchase Computers' Mableton, GA office. The company is based in Houston, TX.*

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UNDERSTANDING PORTED I/O

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Don Person

Mysteries, mysteries — in every direction, HP's new hardware evokes memories of old mysteries, adding fresh ones all the while. For HP desktop system owners raised during the golden age of HP technical computers, marrying old understanding to new reality has been a challenge. Almost nowhere is this more evident than in Vectra's Input/Output (I/O) facilities.

How about trying out this little Vectra Serial I/O true/false quiz?

1. Vectra can't support more than two serial ports.
2. Concurrent use of more than one port isn't possible.
3. Nineteen kilobaud is the highest serial port rate you can set.
4. Only an HP terminal or communication program can use the ports.

A perfect score is FALSE to every question (MS-DOS and Vectra owners' manuals are to the contrary).

"In days of old when code ran slow and the Z80 was just invented, I/O was fun and done on the run, but now it leaves me discontented," sums up the sentiment of a number of old-timers who have lived through the mid-70s and early 80s with HP Series 98xx, 200/300 and 80 PCs. Unfortunately, the attitude it represents doesn't square with the facts.

When you routinely do I/O work with Rocky Mountain, Integral or 80 BASIC, it's easy to forget that most of what we need and use by way of serial and parallel I/O is still the same as what the Vectra or any other computer does. The difference is that the Vectra (and the rest of the MS-DOS family) is based on industry standard IC technology and hardware-compatible circuitry. Gain understanding of one, and you understand them all.

For the moment, I'll concentrate on the inner workings of one of the most important, universally available and poorly understood interfaces — the RS-232 serial port.

THE TYPICAL HP technical computer is so slot-bound, the idea of more than one or two ports of any kind is ridiculous. Would you believe the ES/12 theoretically could support as many as eight serial lines and still have time for a foreground program? (Try that with your Series 200/300!)

Under the bonnet of all Vectras and generic PC XT and AT computers (and a few others), lies a standardized integrated circuit chip set that virtually does all the work of maintaining a top-quality, programmable serial communications port. The smarts behind all this power is the HP 8250, or more common now, the 16450 — almost identical, compatible in performance and universally available. Doesn't it behoove you to learn more? When paired with a line driver chip set and a few LS gates, you have a complete I/O port — just add software.

Unfortunately, most applications and user languages rely on DOS services for reading or writing through the ports. That's a problem. DOS supports transfer rates to 9600 baud. Vectra BIOS extensions push this to 19.2K baud, a divisor higher. The underlying 16450 chip is capable of 56K baud interrupt operation or 115K baud DMA during dedicated handshaking during transfers. Perhaps you've wondered how LAPLINK or BROOKLYN BRIDGE transfer software manages 115K baud while the machine specs say 9600 maximum. The secret is "in the chips."

FIGURE

Summary of Accessible Registers

	Register Address										
	0 DLAB=0	**0 DLAB=0**	**1 DLAB=0**	**2**	**3**	**4**	**5**	**6**	**7**	**0 DLAB=1**	**1 DLAB=1**
Bit No.	**Receiver Buffer Register (Read Only)**	**Transmitter Holding Register (Write Only)**	**Interrupt Enable Register**	**Interrupt Ident. Register (Read Only)**	**Line Control Register**	**MODEM Control Register**	**Line Status Register**	**MODEM Status Register**	**Scratch Reg-ister**	**Divisor Latch (LS)**	**Latch (MS)**
	RBR	**THR**	**IER**	**IIR**	**LCR**	**MCR**	**LSR**	**MSR**	**SCR**	**DLL**	**DLM**
0	Data Bit 0*	Data Bit 0	Enable Received Data Available Interrupt (ERBFI)	"0" if Interrupt Pending	Word Length Select Bit 0 (WLSO)	Data Terminal Ready (DTR)	Data Ready (DR)	Delta Clear to Send (DCTS)	Bit 0	Bit 0	Bit 8
1	Data Bit 1	Data Bit 1	Enable Transmitter Holding Register Empty Interrupt (ETBEI)	Interrupt ID Bit (0)	Word Length Select Bit 1 (WLS1)	Request to Send (RTS)	Overrun Error (OE)	Delta Data Set Ready (DDSR)	Bit 1	Bit 1	Bit 9
2	Data Bit 2	Data Bit 2	Enable Receiver Line Status Interrupt (ELSI)	Interrupt ID Bit(1)	Number of Stop Bits (STB)	Out 1	Parity Error (PE)	Trailing Edge Ring Indicator (TERI)	Bit 2	Bit 2	Bit 10
3	Data Bit 3	Data Bit 3	Enable MODEM Status Interrupt (EDSSI)	0	Parity Enable (PEN)	Out 2	Framing Error (FE)	Delta Data Carrier Detect (DDCD)	Bit 3	Bit 3	Bit 11
4	Data Bit 4	Data Bit 4	0	0	Even Parity Select (EPS)	Loop	Break Interrupt (BI)	Clear to Send (CTS)	Bit 4	Bit 4	Bit 12
5	Data Bit 5	Data Bit 5	0	0	Stick Parity	0	Transmitter Holding Register (THRE)	Data Set Ready (DSR)	Bit 5	Bit 5	Bit 13
6	Data Bit 6	Data Bit 6	0	0	Set Break	0	Transmitter Empty (TEMT)	Ring Indicator (RI)	Bit 6	Bit 6	Bit 14
7	Data Bit 7	Data Bit 7	0	0	Divisor Latch Access Bit (DLAB)	0	0	Data Carrier Detect (DCD)	Bit 7	Bit 7	Bit 15

*Bit 0 is the least significant bit. It is the first bit serially transmitted or received.

Problem number one for DOS is allocating space for data received. If you don't mind the wait, you always can feed a serial port outgoing data one byte at a time if you're patient. You can't anticipate the amount of RAM required for the line receiver, nor can you predict how often you'll be able to service a character buffer, the incoming data flow pattern or baud rate. A buffer big enough for a minute's worth of data reception at 300 baud will overflow after just two seconds at 19K baud. Speeds of 56K baud and up are absurdly high for DOS or the BIOS. This amount of variability is okay if hardware handshaking is a given; then simple strategies for flow control are possible.

For jobs like capturing high-speed wire lines or satellite feeds, you can't tell the sender to stop; you either keep up with the pace or lose data. That's all there is to it.

DOS completely ignores this problem. You get what MODE gives you, plus a pathetic little 128-byte buffer. It's really a shame, since the sum of all Vectra's parts could do much more with a little imagination. Third parties use the 16450 as the core device in simple network schemes, and that just scratches the surface of this chip's immense power.

It's surprisingly easy to exceed DOS and BIOS limits by programming the port ourselves. In order to do so, we must learn more about the serial interface and other peculiar supporting hardware, notably the 8259 interrupt controller chip on the main system board. Clever programming of this combination makes the sky the limit to what we can do. The 16450's power is its programmability. We can specify its interaction with the CPU under a variety of circumstances:

- *When receiver data/line status changes (there's a break, parity or framing error).*
- *When a fresh character has been read by the receiver.*
- *When a character has been completely sent from the transmitter.*
- *In response to a change in "sense" (polarity) on one of the hardware lines attached to the chip. (This would include state changes in CTS, DSR, the ring indicator or CX-carrier detect lines. The starting polarity is immaterial; what counts is a transition.)*

We can pass control on any one or a combination of these conditions, though commonly just the second and third are selected.

If you know what's allowed by way of parity control, you now must suspect that this is traceable to the interface chip, and you'd be right. What most folks don't know is that there's still more you can control. How about word length? You may select as few as five bit words with any number between five and eight being legal. You can change baud rate and toggle any of the modem control lines with simple register manipulation, if you know where to look and what to expect. *Figure 1* gives a complete summary of what the registers do.

The next question is, "How do I get to these registers?"

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Program 1.

```
; EXAMPLE I/O CODE FOR 16450 SERIAL PORT Asynchronous Communication Element
;  (ACE)  permission to copy 2-88  D.E Person
;
;                          OPEN COM1 ... COM2 is similar
;    Entry conditions:     DX = port base address
;                          BX = baudrate divisor
opensr: test    dx,dx                   ; see if invalid port =0
        jz      openq                   ; if so, quit
        add     dx,5                    ; point to MODEM control register
        in      al,dx                   ; see if there is a port installed
        jmp     $+2                     ; insert wait & flush CPU stream
        test    al,128                  ; see if bit 7<>0
        jnz     openq                   ; exit if bad
        sub     dx,2                    ; point to line control register
; dx=dx+3
        in      al,dx                   ; force DLAB to set baud rate
        jmp     $+2                     ; insert wait
        push     ax                     ; save the register on stack
        push     dx                     ; save register pointer too
        and      al,07fh                ; set DLAB =0 for INT reg access
        out      dx,al                  ; set it on the interface
        jmp     $+2                     ; insert wait
        xor     al,al                   ; disable all interrupts
        sub     dx,2                    ; point to INT enable register
        out     dx,al                   ; to avoid hanging
        pop     dx                      ; recover old LCR pointer
        pop     ax                      ; and the old mask
        or       al,128                 ; set DLAB =1 so we can set baud
        out      dx,al                  ; set it on the interface
        jmp     $+2                     ; insert wait
        mov     ax,bx                   ; copy baudrate divisor bytes
        sub     dx,3                    ; point to base address
        out     dx,al                   ; send low divisor byte
        jmp     $+2                     ;
        inc     dx                      ; point to next register
        xchg    al,ah                   ; get the other byte
        out     dx,al                   ; send HIGH divisor byte
        jmp     $+2                     ;
        dec     dx                      ; recover orig port address
        mov     ax,250Ch                ; set up to reset the interrupt cell
;  above assumes port "0C"h  or COM1
        push    cs                      ; move CS --> DS for int vector
        pop     ds
        push    dx                      ; save port base address on stk
        mov     dx, offset serint       ; offset of int handler
        int     21h                     ; dos service to main IRQ 4 vector
;  Now prepare an Interrupt mask byte for 8259  Master IRQ proc chip
        mov     cl,0EFh                 ; prepare interrupt mask bit '4'
        in      al,21h                  ; read the current interrupt mask
        jmp     $+2                     ; and make a '0' bit for IRQ 4 by
        and     al,cl                   ; masking exisitng register status
        out     21h,al                  ; send back to 8259 port address
        jmp     $+2                     ; now prepare 16450 to make INTS
        pop     dx                      ; recover base again
        add     dx,4                    ; must set OUT2 for physical INT
        in      al,dx                   ; read the current register
        jmp     $+2
        or      al,OUT2                 ; set OUT2 enable bit
        out     dx,al                   ; physically enables gate on card
        sub     dx,3                    ; last point to int enable register
        mov     al,XMIT_REV             ; mask for rcvd data & xmit b.f MT
        out     dx,al                   ; now card can interrupt too,
openq:  ret                             ; card is activated
; ####################################


; Interrupt handler    ISR
;       ALL Ports set to IRQ 4 use hardware OR for IRQ lines
;       we poll the cards (IF there ) to see who wants service
;acknowlege IRQ INT ONLY after verifying no ports not asserting the line
serISR  proc    near
        sti                                     ; allow other ints now
        pusha                                   ; pushall .286 instruction
        push    ds                              ; save data segment
        push    cs                              ; move cs to ds
        pop     ds                              ; set up to read int stuff
        mov     cx,word ptr [ioaddr]            ; get port 1 base address in CX
        inc     cx                              ; add 2 for IIR
        inc     cx
        mov     bp,word ptr [ioaddr2]
        inc     bp
        inc     bp
;   BX has amount USED IN the buffer This will be accurate within 3 bytes
;           CX   has   address of INT ID register port 1 or 2
;           BP    "      "                          port 3 or 4
;
 intal: mov     dx,cx                   ; CHECK First port
        in      al,dx                   ; get int id register
        test    al,1                    ; still pending ??
        jnz      seepl                  ; skip the rest
        mov      si,offset ioaddr       ; si address of port address
        mov      di,offset rbuf         ; di = HEAD of input buffer
        add      di,[count]             ; point to next free place in bfr
        mov      bx,rbufsize            ; max space allocated for buffer
        sub      bx,[count]             ; how much room in buffer ?
        call     inthdl                 ; do major subroutine
 seepl: mov     dx,bp                   ; CHECK port # 2
        in      al,dx                   ; get int id register
        test    al,1                    ; still pending ??
        jnz      polll                  ; skip the rest
        mov      si,offset ioaddr2      ; si address of port address
        mov      di,offset rbuf2        ; di = head of input buffer
        add      di,[count2]            ; point to next free place in bfr
        mov      bx,rbufsize            ; max space allocated for buffer
        sub      bx,[count2]            ; first find out how much room in buffer
        call     inthdl                 ; do major subroutine
polll:  call stillpend                  ; test for any ints still pending
        jz  intal                       ; NO still more left
;
;       Now reset the master interrupt controller
;
intfini: cli                                    ; no interference here
         mov     al,64h                         ; acknowledge interrupt
         out     20h,al                         ; note specific IRQ reset for #4
         sti                                    ; back on with INTS
         pop     ds                             ; restore registers & beat retreat
         popa                                   ; complementary .286 instruction
         iret                                   ;
;   ************************************
;   int id polling subroutine   ZERO flag carries success failure 2 caller
;       CX has id reg for port 1
;       BP     covers second port on the int OR chain
;   ************************************
stillpend:  mov    dx,cx                        ; CHECK FIrst port
            in     al,dx                        ; get int id register
            test   al,1                         ; still pending ??
            jnz     see2
            ret
see2:       mov    dx,bp                        ; CHECK 2nd port
            in     al,dx                        ; get int id register
            test   al,1                         ; still pending ??
            ret
;   ************************************
;
;   SUB routine called by everyone else
;
; ON entry   DS =CS
;            DX=port base address
;            BX=amount IN the buffer to be used
;            DS:SI--> port address count / info base base
;            DS:DI--> next free rcv buffer spot
;            AX = port comm scratch register
;            CX   has   address of INT ID register port 1 or 3
;            BP    "      "                          port 2 or 4
;  NOTE: This allows up to 4 ports to share a common IRQ line
;        as these are a precious resource in the AT.       dep
;        Using 74LS32   OR gates

inthdl: mov     dx,[si]                 ; get port base addr
        add     dl,5                    ; register 5
        in      al,dx                   ; read the line status register
        sub     dl,5                    ; point to I/O base register 0
        test    al,128                  ; any card at all ??
        jnz     inhrtn                  ; no -- exit
; this step permits gaps in the base addr scheme & prevents crash
        test    al,1                    ; see if data available
        jz      inhxmit                 ; see about transmitting then
        in      al,dx                   ; read the character
;
; we need to read the char no matter what to free the port & clr int
;
        cmp     bx,isize                ; is there any room in buffer ?
        jb      add2it                  ; is < full
        jmp short inthx
add2it: mov     ds:[di],al              ;  DS: save the character
        inc     ds:[si+2]               ;  DS: increase count
inthx:  add     dx,2                    ; see about INT type
        in      al,dx                   ; see if interrupt still pending
        test    al,1                    ;
        jz      inth                    ; bit 0 should be '1' if no more
inhrtn: ret
;
; xmitter check / output
;
inhxmit: test al,32                     ; is bit 5 set in stat reg ?
         jz   inhrtn                    ; xxxitt--->
         mov  ax,[si+4]                 ; get output count
         cmp  ax,0                      ; any to send ??
         jz   inhrtn                    ; go  if no more
         inc  ax                        ; set up pointer
         mov  bx,ax                     ; index time
         mov  al,[si+bx]                ; get next xmit char
         out dx,al                      ; send it
         ret
serISR  endp
;
;               DEFAULT VALUES FOR SERIAL PORT  com 1&2
ioaddr          dw 03F8h                ; default to address of port 1
count           dw 0                    ; received character count
xmit            dw 0                    ; pointer of chars to send
ioaddr2         dw 02F8h
count2          dw 0
xmit2           dw 0
bauddiv         dw 96                   ; gives 1200 baud with 1.8mhz rock
XMIT_RCV        EQU 3                   ; bit pattern for RCV + XMIT IRQ
DTR             EQU 1                   ; constants for modem ctl reg #4
RTS             EQU 2
OUT1            EQU 4
OUT2            EQU 8
loop            equ 16
```

FIGURE 2

Baud Rates Using 1.8432 MHz Crystal

Desired Baud Rate	Divisor Used to Generate 16 x Clock	Percent Error Difference Between Desired and Actual
50	2304	—
75	1536	—
110	1047	0.026
134.5	857	0.058
150	768	—
300	384	—
600	192	—
1200	96	—
1800	64	—
2000	58	0.69
2400	48	—
3600	32	—
4800	24	—
7200	16	—
9600	12	—
19200	6	—
38400	3	—
56000	2	2.86

All the values shown at the top of the box are indexed from a base value determined by the adaptor card. For port COM1, this base address is 3F8 hex or 1016 in base 10. The second port (COM2) is by convention at 2F8 hex or 760 decimal. For the moment, we'll deal just with COM1. This means that register #0 is at 3F8, while #1 is at 3F9 and so on.

Reading or writing these ports involves using the IN or OUT CPU instruction. In a high-level language such as True BASIC, I/O port operations are done through the simple expedient of using a negative address argument.

PEEK (-1*1016) returns the byte received by the port. POKE (-1*1016,64) would send the "@" sign out of the port.

Assembly language gives us more speed and power, not to mention flexibility, but the idea is the same. In order to tie this together, assembly language is the perfect glue, since there's one thing we need to supply that high-level languages can't — an Interrupt Service Routine (ISR).

Virtually everything else could be done with a decent high-level language, but only assembly or "in-line assembly" in C efficiently performs this critical part of the job. You'll want a pair of buffers — one to hold received data as it becomes available and, if you wish, a complement for transmission to be able to send in background. Then, when the 16450 is ready to source or receive more information, it triggers a hardware interrupt (IRQ line) and our assembly code fetches or stores as required. It's a little more complicated than this, but *Program 1* is some essential code that illustrates this critical undertaking both to set up the port and to handle it when an interrupt occurs.

There are a number of steps that need to be followed in the correct order to initialize and ready a COM port for service. Ignoring a step or screwing up the order risks sending your computer off to slumber land.

Here's how to avoid the major pitfalls:

1. Before you commence with an "open," be sure there's a physical port.

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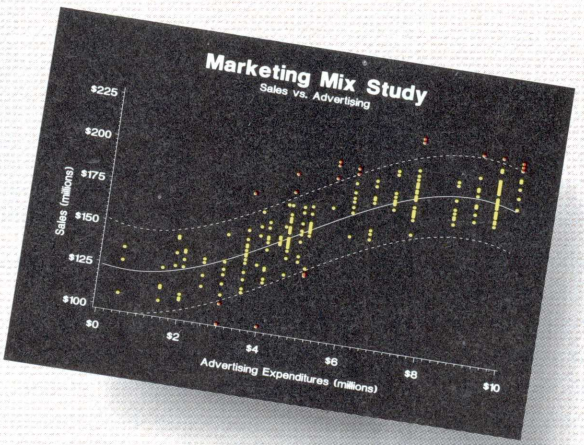
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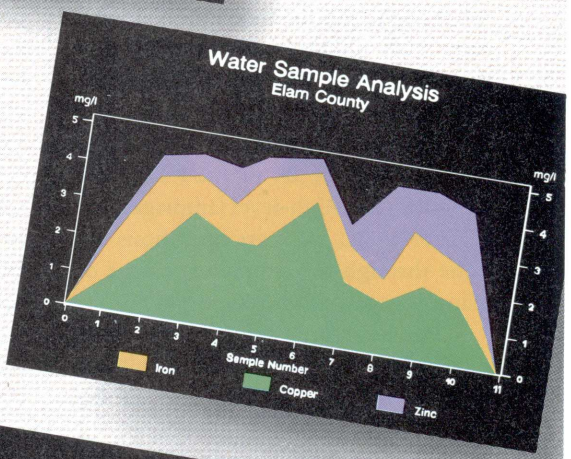
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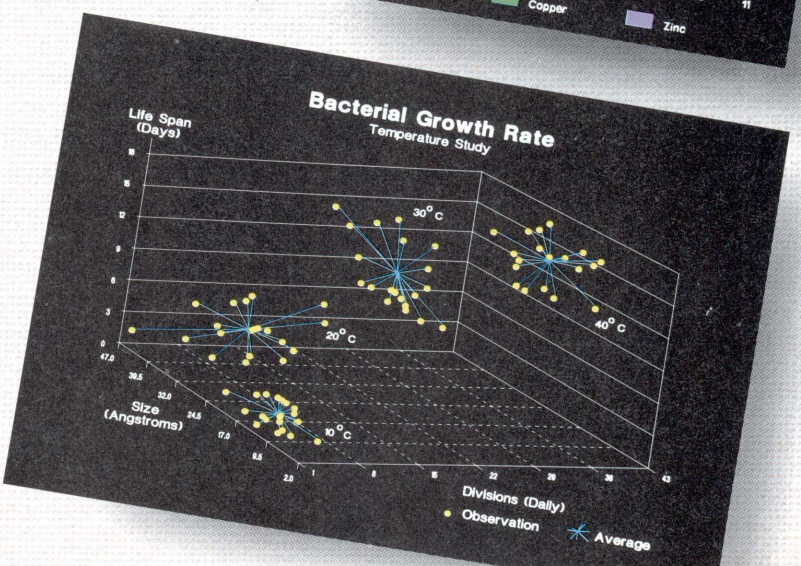
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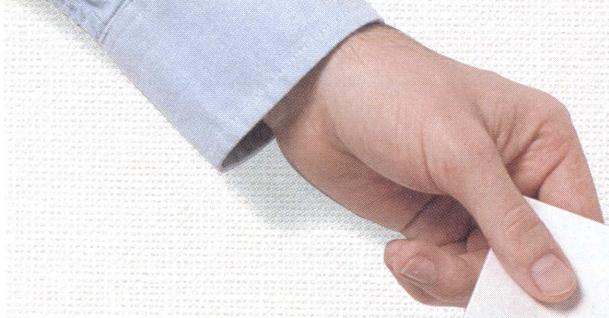
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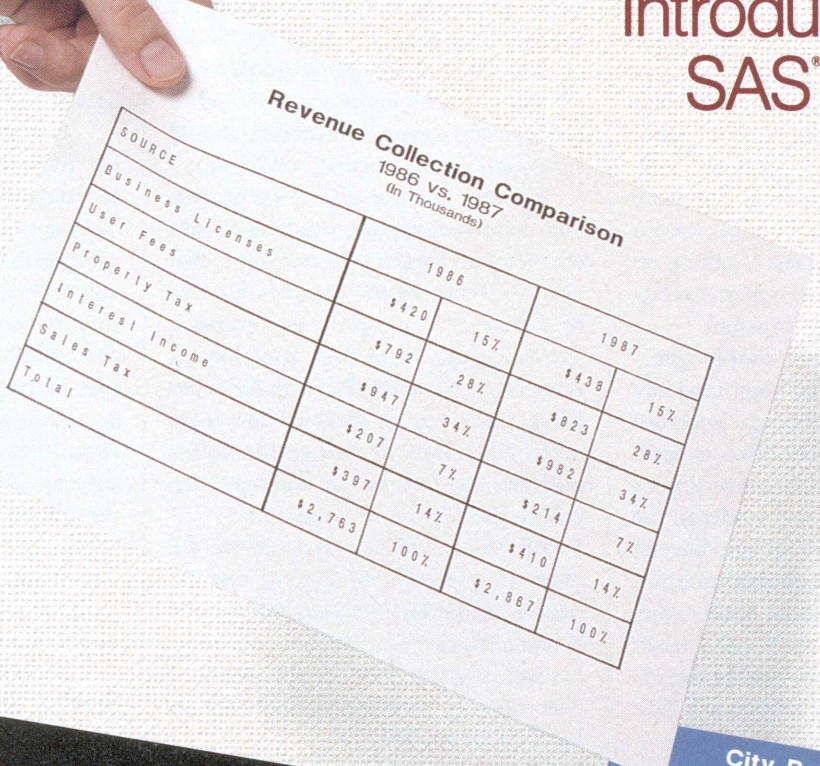
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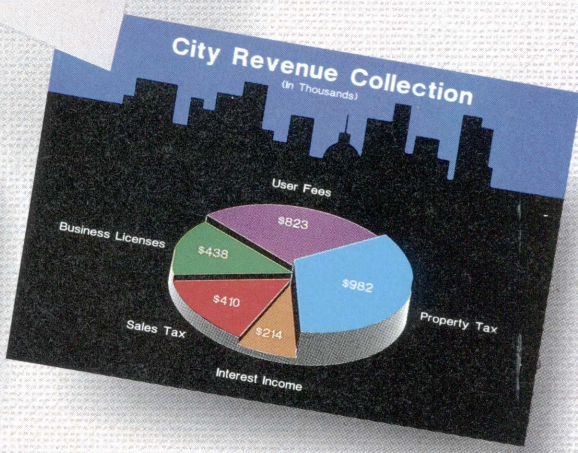
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SOURCE	1986		1987	
Business Licenses	$420	15%	$438	15%
User Fees	$792	28%	$823	28%
Property Tax	$947	34%	$982	34%
Interest Income	$207	7%	$214	7%
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Total	$2,763	100%	$2,867	100%



International Demographics Study
(% of Population Over Age 60)

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Get the base register address and add five to it. Notice in *Figure 1* that register five conveys line status and bit number seven is always zero. If the port controller is absent, all you'll get when you request an IN from the CPU will be a character FFh (a byte with all 1s), since the bus is unterminated if no port is there to hold data bits down. Checking for a zero bit in position seven guarantees that you aren't talking to nowhere and it protects you later when you really could hang yourself.

2. Always immediately disable interrupts on the chip before beginning any other programming. If a legal interrupt condition should occur (like a fresh character received on an active line or a carrier-detect on a live modem), the chip won't activate the ISR you haven't yet installed or act on a doomed routine. Once this is done, you can diddle away to your heart's content. Finally, when everything else is done, enable the interrupt conditions you wish to use. This is vital.

3. Set the desired baud rate. To do this, you have to set the Divisor Latch Access Bit (DLAB) to switch to the alternate use of registers one and two. That's the explanation for the dual-purpose headings. Failing to clear the DLAB when finished makes it impossible to re-enable chip-level interrupts and send or receive data, so you immediately should set it back to its normal condition.

4. In order for the system to process your hardware request, you have to alert the Master interrupt controller that you'll be using an IRQ channel. Do this by setting a "0" bit in the service mask for that chip. Note that after having done so, you still aren't ready for servicing, since you've disabled the 16450 itself. I use DOS to change the vector entry for IRQ 4 to my ISR, and only then enable the system to jump to it.

5. All that's left now is to allow the 16450 to interrupt the system. Set the hardware interlock (OUT2), then set the permissible cases for an interrupt in the "cause" register (IER or #1). Received data now is recognized and will be handled by the ISR.

6. To get received data in blocks, you must examine the count of received characters, remove them from the buffer, SHUT OFF interrupts and either move the remainder down in the buffer or use circular pointers to keep track of what's been received and what has been passed out to the foreground.

Once you become familiar with the ins and outs of the 16450, a lot of interesting possibilities open up. To go to high-speed transfers, you need a bit of cabling. If you cross over RTS—>CTS and DTR—>DSR on the cable connecting two computers, you can move into the lightning transfer league. The basic idea is that you enable interrupts only on a change in modem status (bit 3 in reg 1 is set true). Now instead of interrupting for a character, the chip waits for a toggle on the DSR line. That's also what the ISR looks for. When found, you begin a dedicated exchange that continues until either the DSR transition reoccurs, or a receive timeout happens.

At high speeds, it becomes impractical to interrupt for each character, because stack framing on multiple lines could begin to grow out of control. At 38K baud, each line requires attention every 250 microseconds. This alternative method of signaling for a fast block move begins to make sense, since you still can permit other ports to interrupt on a character basis during the transfer.

The easiest way to do this is to "hardwire" a register value into the code, execute a CLI, handshake the RTS—>CTS line, get the character and then do an STI before storing the byte. This way, other routines get to execute based on their priority, even during a long transfer.

This last method lets you move up to speeds over 10 KB per second, but is still well below processor and hard disc transfer rates. However, it's over 10 times faster than the highest officially supported serial rate. If you need medium fast transfers, this might be the idea to adopt. — *Don Person is an independent consultant based in Albany, NY.*

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DESKTOP PUBLISHING

Ashley Grayson

Vendors Are Beginning To Focus On Another Glamor Market — Desktop Presentations

The DTP Market Split

True *desktop publishing* (DTP) is a relatively narrow range of products that integrate text and graphics to produce small quantities of laser printer originals. Whether the metaphor is Aldus' electronic light table delivered in *PageMaker* or *Ventura Publisher*'s automation of structured documents, the goal is to blend the output of other PC programs into a composed page.

This makes them fine prepress composition tools, but it omits several factors from the process of publishing. These include, at the front end, the support environment to collect, edit and manage the source materials and, at the back end, the distribution of results.

Furthermore, promoters of desktop publishing, with the appeal of beautiful layouts, have distracted businesses from the bread-and-butter action documents that get things done.

The desktop publishing industry promotes DTP as easy to do, but unless the tools are placed in the hands of someone with the time and the right talent, it isn't likely to be done well. Not everyone can edit, and not everyone has the ability to visualize the paste-up process and the artistic skill or training to make eye-appealing layouts. Unfortunately for desktop publishers, instead of developing the missing pieces, DTP vendors are focusing on yet another glamor market — *desktop presentations.*

DESKTOP PRESENTATIONS IS A WAY of delivering the benefits of DTP in a shorter time span with less effort. It cuts layout time by placing less on the page. It eliminates the need for writing and editorial skills by centering on short-lived presentation frames consisting of charts and bulleted lists. It addresses the delivery problem by going after smaller audiences that can be served by the low page rate of today's desktop laser printers. By using the computer screen itself as the presentation media, it adds the potential for color and animation.

There's certainly nothing wrong with desktop presentations as a market or a tool. Hewlett-Packard's *Graphics Gallery* has been doing the basic job for years, making color transparencies with multipen plotters. The challenge is to realize that both of these areas are part of the same puzzle: getting information into documents that people can work with.

These two industry darlings are only the most glamorous of the document formats that business runs on. The third and least glamorous, *forms*, may be the most effective one to computerize.

Electronic Forms

Nobody seems to have noticed, but the skills of a successful desktop publisher — editorial, an eye for good layout, and the ability to deal with fonts and laser printers — can deliver bigger returns when publishing forms. The output of desktop presentation systems may live an hour; a desktop published sales tip sheet, a week; the departmental newsletter, a month. Forms, on the other hand, may live for years. They are filled out, filed, "keyed" by data entry clerks and distributed everywhere, from shipping departments to government agencies.

Almost unnoticed by the big guys — Microsoft, Ashton Tate and Borland — electronic forms may be able to pump more action documents through your laser printer than all the *PageMakers* in the company.

The following is a quick rundown of major products in the desktop publishing, desktop presentations and forms processing markets.

Desktop Publishing

Microsoft Word 4.0 (Microsoft Corporation) should always be listed as a fundamental desktop publishing tool. Its management of documents by style sheets and excellent support for laser printers put it at the forefront of publishing software. Especially good for publishing technical documentation and books of less than 200 pages, it only lacks a layout facility to do more complex functions. Its beautifully integrated outliner can key an automatic table of contents.

Caveats: Even *Word 4.0* has only a rudimentary ability to merge text and graphics.

Recommended hardware: An EGA is strongly recommended for on-screen, italics, underlines, boxes, etc. *Word 4.0* supports PostScript printers, but even it doesn't easily support all downloadable fonts for LaserJet printers. (See "The Latest Word," *HP PROFESSIONAL*, February 1988.)

PageMaker (Aldus Corporation) is an excellent tool for the page designer and layout artist. It is HP's choice for merging text and graphics, and probably the best PC-based tool for creating brochures and any document with unique and complex pages. Most recent releases are much easier to use than the initial release.

Caveats: Some artistic talent is required to fully derive its key benefits.

Recommended hardware: A standard EGA monitor can be used, but it only will show a portion of the layout.

A large screen display is required for viewing an entire 8½-inch by 11-inch page. For designing a two-page layout, a two-page display is desirable. These large displays run $2,000 and up and require a special controller board in the PC, but are worth more during layout than another 2 MHz of processor speed and faster hard disc.

Ventura Publisher (Xerox Corporation) takes up where Microsoft *Word* leaves off. It features limited but usable editing facilities for correcting text files during layout and an excellent ability to integrate text and graphics. It also can merge text files from word processors such as *Word*, *Word Perfect* and *Wordstar* into a uniform document. There's no practical limit on the number of pages in chapter or document.

Caveats: There's no drawing program capabilities and limited ability to construct graphics in *Ventura*. There's no automatic ability to balance columns across multi-page tables, but it contains a good workable facility for tables that lay out on a single page. It's not quite compatible with the HP bus mouse on the Vectra. The Vectra occasionally will hang. Save early, save often, save under different names.

Recommended hardware: Same as *PageMaker*. (See "Getting the Job Done, "*HP PROFESSIONAL*, October 1987.)

Missing features work flow: No vendor offers a system for managing the cycle of editing, fact checking and approval required during the desktop publishing process. With multiple revisions of text files, graphics files, images, etc., a desktop publisher can get lost without a serious, workable logging system. *Word 4.0* takes a step in the right direction by building a file summary record (who, what, when?) visible in a pop-up window within *Word*, but *Ventura* clobbers it during layout. Since the big layout programs run under windowing operating systems like GEM (*Ventura*) and Microsoft Windows (*PageMaker*), consider using the note pad features of those products to keep your production notes.

Component management: No product really interfaces well with the operating environment. *Ventura* informs you if text or image files are missing from a chapter, but it won't tell you if the correct fonts aren't available. Microsoft *Word* will tell you if the style sheet is missing, but it won't tell you where it was looking or what it expected to find.

Graphics: No DTP package includes any graphic support for the creation of graphics. Editing of images is limited to stretching and cropping. It's interesting that, except for Adobe Systems Inc.'s *Illustrator* on the Macintosh, no drawing or painting program has been released specifically for the needs of the desktop publisher.

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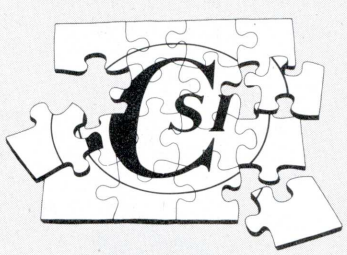
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Table processing: No DTP package supports real table processing. Accepting a spreadsheet and aligning to tabs is not table processing.

The best output device for desktop publishers is still the LaserJet Series II. With one to two megabytes of RAM, it will handle large images and/or lots of downloadable fonts. Literally every software package supports it. For those needing more LaserJet, the only HP upgrade with greater speed is the $20,000 LaserJet 2000. Clearly, there's a hole in HP's printer offerings in the $5,000-$7,000 medium-performance range.

Today the *LaserJet compatible* market isn't too appealing. Compatibility seems to be incompletely implemented on

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many laser printers claiming the virtue. Other printers run slower than their rated speeds in HP-compatible mode. Tomorrow the picture will change. The new *LaserWriter II NTX* from Apple supports both *PostScript* and HP LaserJet compatibility. It also supports an attached hard disc as a font server, making it the first small office product to adopt the concept from the high-end Xerox printers. The choice between an *NTX* and HP LaserJet II with the QMS *PostScript* card is not clear. Other vendors are readying printers that also emulate the HP 7475 plotter and will output to an 11-inch by 17-inch page.

Laser printer enhancements fall into several areas: additional fonts, speed improvements and *PostScript* or other page-description capability. Most font enhancements are delivered as downloadable files as opposed to the cartridges that most laser printer owners begin with. Hewlett-Packard, Bitstream and Conographic all provide interesting font libraries. Historically, you ordered a font package for a specific face, orientation and size such as Conographic's Globe Gothic Outline, available in 10, 12, 14, 18, 24 and 30 point. The problem was, if you really wanted 9, 11 or 48 point, you were out of luck.

Until recently, only *PostScript*-equipped laser printers automatically could scale fonts on demand. Bitstream's new *Fontware* products bring this ability to any compatible laser printer by using the PC to derive the fonts. The resulting custom libraries then can be downloaded as before. Keep in mind that these fonts are distinct and different from *PostScript* fonts. If your shop has both types of printers, you'll need both types of font libraries. While downloadable fonts offer the maximum flexibility for the desktop publisher, they aren't operationally simple. Even with *Ventura* automatically loading them, they still require a high degree of operator awareness.

LaserJets never achieve their rated speeds of eight pages per minute while doing desktop publishing or presentation transparencies because of the data transfer bottleneck between the computer and the printer. One way to overcome this is to bypass the standard interface, usually a parallel port, with a *faster interface*. This is the technique of the *LaserMaster* (LaserMaster Ltd.) and Imagen's *PC Publisher Kit*.

The *PC Publisher's Kit* is a hardware/software package that includes a 68000-based add-in board for the PC and cable splice for the LaserJet or other first-generation Canon printers. (It doesn't work on the LaserJet II.) It reduces print time by 100 percent or more, includes emulation for many other printers (Diablo 630, MX-80, Qume Sprint 5, etc.) and has its own set of fonts!

The *LaserMaster* enhancements bypass the LaserJet controller like the Imagen device, but don't add the confusion of a non-standard language and yet another font system. *LaserMaster* is customizing Bitstream *Fontware* for its device.

PostScript controllers for the LaserJet and LaserJet Plus physically replace the top of the printer. The QMS controller for the LaserJet II plugs into the expansion slot. When evaluating a *PostScript* option, determine if the mechanism provides for high-speed transfer between the computer and printer. A serial port *PostScript* interface is terribly slow.

Desktop Presentations

HP Graphics Gallery is an underappreciated pair of presentation building tools that have been around for several years. *Charting Gallery* turns numbers (such as spreadsheet columns) into pictures with little effort. A variety of pie, bar, stacked bar and line graphs can be produced easily by any office worker. *Drawing Gallery* is an object-oriented, vector drawing system with a good

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Charts prepared with *Charting Gallery* can be passed to *Drawing Gallery* for editing or enhancement. Both were designed to produce transparencies and paper presentations on HP's line of plotters. As such, they lack many of the features of on-screen "presentation packages" such as *Harvard Presentation Manager* (Software Publishing Corp.), *Show Partner* (Brightbill-Roberts & Co. Ltd.), etc. They will, however, produce .TIFF format files useable by *PageMaker* and .HPGL format files usable by *Ventura*.

Gallery is a vector-based drawing package, so try to import a vector file whenever possible rather than a rasterized image file such as a *PC Paintbrush* (Z-Soft Corp.) .PIC file. *Drawing Gallery* is so easy to use, the documentation is nearly superfluous.

Caveats: The manual is written in a style that matches the presumption that you won't need it. While it is clear, it also is incredibly simplistic and offers little or no information about what to do when the program doesn't do what you want.

Lasersoft 3000 from BSI Business Systems Inc. is a forms design and data merging package for the HP 3000. Especially useful in database-driven publishing, it allows data centers running HP's venerable multiuser computer to provide departmental laser printing via the LaserJet family.

For PC-based electronic forms, BSI is releasing *Data Entry II*, a system for entering and capturing data based on a form. The marketing for this product is service-oriented. You mail your forms to BSI and you'll receive an electronic version of the form, an interactive template to prompt a worker through the input process and the *Data Entry II* control program.

When evaluating a PostScript *option, determine if the mechanism provides for high-speed transfer between the computer and printer. A serial port* PostScript *interface is terribly slow.*

The operator enters the data, proofs it on the screen, prints on the local laser printer for an immediate hard copy, and goes on to the next task. *Data Entry II* selects the correct form and template, manages the laser printer and stores all the data that was entered for input to your PC database or for uploading to another computer.

Indigo Software's *IPRINT* is a PC-based forms design system that allows you to cut and paste your own form with a mouse and graphics CRT (see *"IPRINT," HP PROFESSIONAL*, April 1988). It works well on a Vectra ES with a NEC Multisynch monitor. Between *IPRINT*'s do-it-yourself product and BSI's service, there's something for everyone. Indigo also offers *IPROMPT*, a data entry module similar to BSI's *Data Entry II*.

IF YOU THINK we're overly enthusiastic about forms, consider this: Apple launched the desktop publishing industry via *PostScript* and the Macintosh. Clairis, the software company spun off by Apple, is introducing its first new products this spring: two forms packages! —*Ashley Grayson is founder of ADG, a marketing services organization based in San Pedro, CA.*

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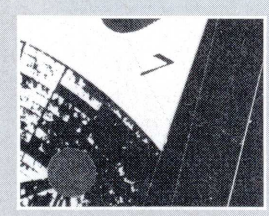
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DEVELOPMENT

Lisa Burns Hartman

Protecting Your Data While Providing Adequate Response Time

Locking Without Locking Up

It's not always easy to design a locking strategy for a new application on the HP 3000. As a programmer, you may wonder: Should I lock my database at the set level or at the entry level? Is it necessary to lock my KSAM file? What about that MPE sequential audit file? Should I lock that too? Also, how do I handle user input within my locking strategy? Finally, why should I bother locking in a batch job?

All these questions boil down to one: How can I protect my data and still provide adequate response time? In this article, I'll discuss good locking techniques for online and batch programs, and the locking options available to programmers using MPE, KSAM and TurboIMAGE databases. Finally, by examining locking examples from our MIS environment, I'll show how good locking strategies can improve the response time and availability of applications and keep programmers and users happy.

Locking for disc files on the HP 3000 is available for MPE and KSAM files, and IMAGE databases. It's important to understand that, in all three cases, HP 3000 locking is logical, not physical. This means that locking doesn't prevent access to the file, but acts only as a flag to other programs that the file has been locked.

For example, suppose Program A issues a lock against File 1. Now, suppose Program B attempts to lock File 1. The lock call wouldn't succeed, and Program B would wait until Program A unlocked the file (see *Figure 1a*). However, suppose Program B didn't attempt to lock File 1, but simply wrote to File 1 (see *Figure 1b*). The write would be successful, since the operating system has no physical lock in place. Logical locking means that all programs accessing a file must lock in order to ensure data integrity.

Once your application opens more than one file or dataset, however, things become more interesting. It's critical that all programs accessing two or more files lock and unlock the files in the same order. Consider what will happen in *Figure 2*. Program A issues a lock against File 1. Next, Program B issues a lock against File 2. Everything is okay so far. However, now Program A attempts to lock File 2. The lock attempt is unprocessed, since File 2 already is locked by Program B, so Program A will wait. Now, Program B attempts to lock File 1. This attempt also is unsuccessful, since File 1 already is locked by Program A! Now, Program B also will wait.

Both programs are going to be waiting for a long time. This nasty situation is called a *Deadly Embrace* and requires a warm start in order to free Files 1 and 2. The situation could've been prevented by locking the files in a predefined order. Alphabetical order works well to ensure that all programs lock consistently.

Another technique to prevent the *Deadly Embrace* and other locking problems is conditional locking. If a program conditionally locks a file, it won't be put into a wait state if the lock attempt fails. Instead, control will be returned to the program, which then can make a decision about how to handle the failed attempt. The program can try the lock again, perhaps several times, to see if the lock is freed. Alternately, a message could be displayed to the user: "Other updates in process, please try again."

Finally, if a lock is essential for the program to proceed, the program could terminate with the message, "Unable to access database. Please have users log off, then rerun job." No matter what happens, at least the program won't wait indefinitely!

When designing a new application for the HP 3000, it's extremely important to design a locking strategy early in the process.

NOW THAT WE KNOW the basics of good locking, let's look at how to implement locking for a batch process. You may wonder if it's necessary for a batch process to lock at all. It is, if the batch process will be run at the same time that either another process will be accessing the file, or either of those processes is writing.

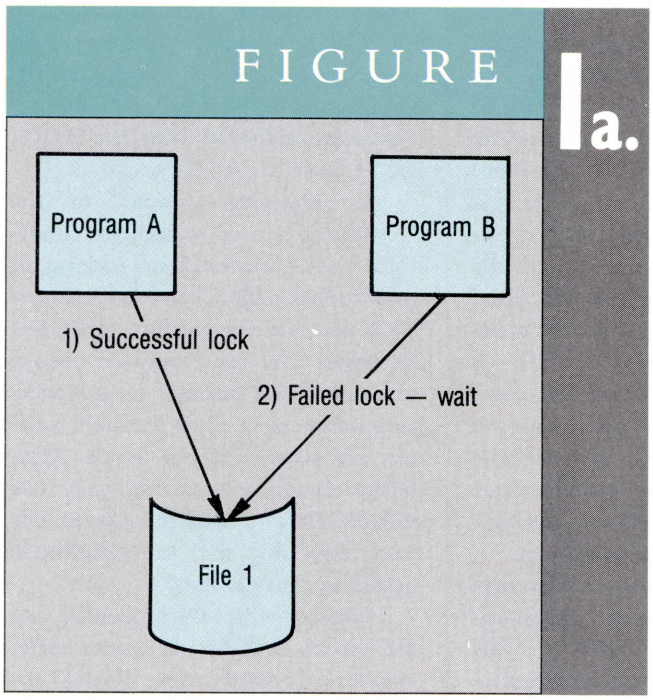
Figure 3a illustrates what may happen if two processes are accessing the same file without locking. Program A reads the data record and retrieves the value "W." Program B then reads the same record, again with the value "W." Now Program A writes the record back, placing the new value "X" into the record. However, since no locking is in place to prevent it, Program B now writes to the same record, overlaying Program A's changes with the value "Y."

To prevent this scenario, a batch

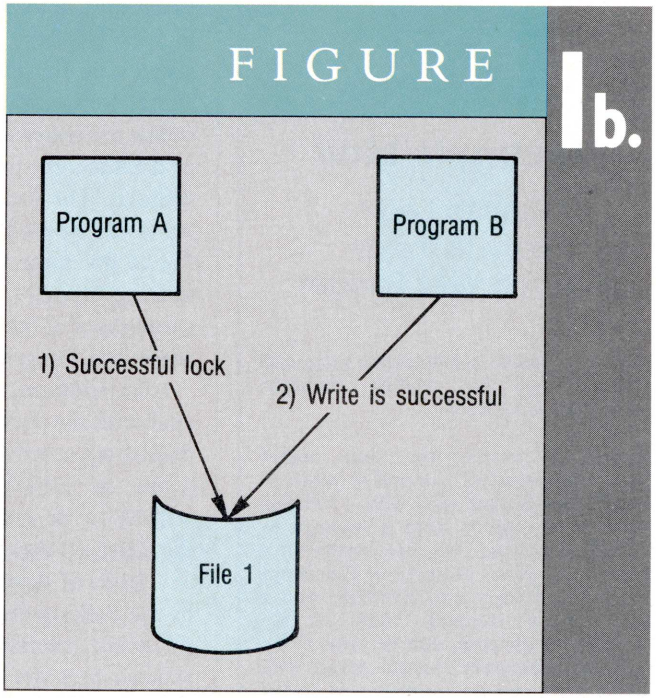
process should protect itself with a good locking strategy. *Figure 3b* shows a locking example for a batch process. Locking around the read and write will ensure that another process doesn't update the file between our read and write.

Certainly, there's an alternative strategy to locking for a batch process. By opening the file or database exclusively, the process can do without locking, since the open will guarantee that no other program is updating the file. However, this may be an impractical approach for many data centers.

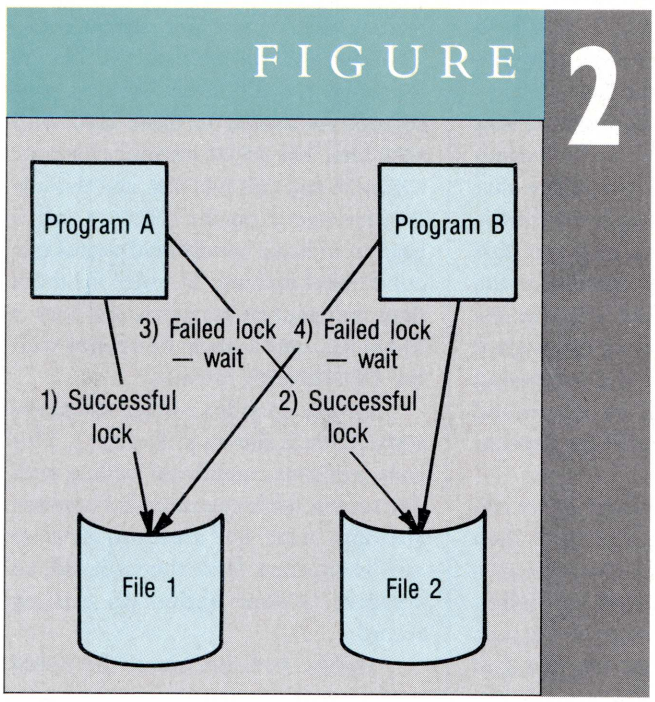
Increasingly, users are demanding more uptime from their online applications, sometimes as much as 14 hours a day. Combined with system backups,



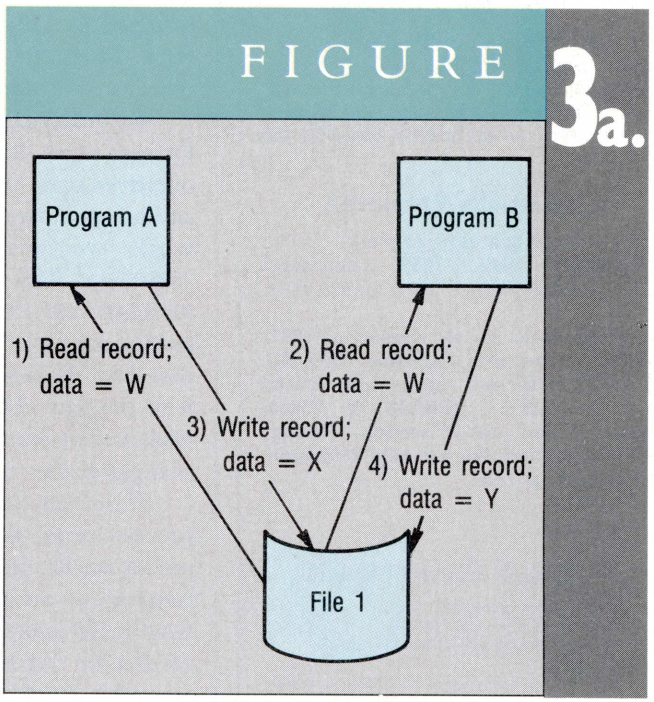
If both programs lock, access is controlled correctly.



If one program doesn't lock, write is successful with lock in place.



Locking files in a different order causes **Deadly Embrace**.



If no locking is done, data integrity is lost.

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this doesn't leave much time for running batch jobs that require exclusive access to an online database. Jobs that are run once a month or once a week probably can get away with exclusive opens. However, my recommendation for batch jobs is to do shared opens with locking to allow data centers as much scheduling flexibility as possible.

If we introduce the complexity of online processes accessing the same file or database, our job becomes a bit more difficult. The fact that many user sessions will be reading and updating our file at the same time means that our locking strategy must provide good throughput at the same time that it ensures data integrity.

In addition, our programs must deal with the inevitable pause between displaying a record to a user and the point at which the user presses <ENTER> or <RETURN> to transmit the changed data to the computer.

Both of these issues are addressed in the locking strategy for online applications shown in *Figure 4*. This strategy provides excellent performance since it avoids locking around user input. Thus, we avoid holding a locked file while a user gets coffee, goes to lunch or leaves for the day. The lock is held for as little time as possible, allowing other users to access the file.

By unlocking the file while we wait for user input, however, we're leaving ourselves open to the possibility that another user may have updated the file while we were waiting to hit <ENTER>. This is the reason for the RE-READ and COMPARE steps in the locking strategy. By storing the original data from the first read and comparing it to the data obtained by the second read, we can check to see if the data has changed in the interim.

If the data hasn't changed, we can proceed with the update and then unlock the file. If the data has changed, however, we can display the new information and issue a message to the user so that he can re-input the changes. Since this should rarely occur, this approach should be acceptable to users. Most important, data integrity is guaranteed.

Let's look at the options open to us for locking various types of files on the HP 3000. Simple MPE flat files are locked at the file level, meaning that, even if users are accessing different parts of an MPE file, the second process must wait until the first process unlocks the file before a lock will succeed. MPE files are locked and unlocked using the FLOCK and FUNLOCK intrinsics.

A parameter, *lockcond*, on the FLOCK call is used to indicate conditional versus unconditional locking. In order to lock a file, a process must have LOCK access at the account, group and file levels. The file should be opened with an FOPEN intrinsic with *aoptions* parameters set to allow dynamic locking and semi-exclusive access. With default capabilities, a process may lock one MPE file at a time. In order to lock more than one file, MR (MultiRIN) capability must be used.

Locking with MPE sequential files also ensures that the file system buffer contents are posted to disc. When a program issues a FUNLOCK call, the data in that program's buffer is written out to the disc file. Thus, the next program reading the file will get current data.

Like MPE flat files, KSAM files are locked at the file level. Locking procedures are similar to those used with MPE files. The KSAM intrinsics used are CKLOCK and CKUNLOCK, and the *lockcond* parameter on the CKLOCK call is used to indicate conditional versus unconditional locking. In order for more than one process to access and lock a KSAM file, the file must be opened with the CKOPENSHR intrinsic.

Sample code for adding records to a KSAM file is shown in *Program 1*. This code performs conditional locking with five retries, with a pause called between attempts. After five attempts, an error will be returned. Since this is an add, no compare is done against an existing record.

Unlike MPE intrinsics, the KSAM

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intrinsics enforce locking by issuing errors if locking procedures aren't followed properly. This means that if a process opens a KSAM file with CKOPENSHR and then attempts to write, delete or update records without first locking the file, an error is returned. This will help ensure that all programs accessing a KSAM file correctly perform locking.

Database locking in IMAGE is perhaps our most complex locking environment. Our goal here is, at the start of each transaction, to set up locks that cover all of the data entries that we intend to modify. This means that for DBPUTs, DBDELETEs and DBUPDATEs, we need to have covering locks to ensure that the records we are modifying don't change until our transaction is complete.

LET'S LOOK AT OUR OPTIONS. The simplest strategy from a programming standpoint is to lock at the database level. This will work similarly to MPE and KSAM locking by allowing only one user to access the database at a time, even if different datasets or records are being accessed.

The IMAGE intrinsics DBLOCK and DBLUNLOCK are used for locking. To lock at the database level, call DBLOCK with the mode parameter set to 1 (unconditional) or 2 (conditional). Database-level locking certainly meets our goal of covering the data entries we're going to modify, since we're locking every record. However, this level of locking gives the poorest performance for multiple users. For online applications, we probably would be better off using either dataset- or entry (record)-level locking.

Dataset-level locking can provide good performance, especially if users are likely to be accessing only one dataset for a given transaction. For example, a user may use one screen to update an inventory dataset and another to update a customer dataset. By locking one dataset at a time, again using the online locking strategy described in *Figure 4*, we can achieve fairly good performance. Dataset-level locking is invoked by setting the mode parameter on a DBLOCK call to 3 (unconditional) or 4 (conditional).

Dataset-level locking also is the only choice available when additions or deletions are made to a master dataset. Adding a record to a master set may cause two entries that hash to the same physical location in the set, causing a synonym chain to be built. Deleting a record from a master data set later may cause the secondaries to migrate back to the primary hashing location. For this reason, the entire dataset must be locked via a database or dataset-level lock in order to add or delete.

For database designs where one user transaction requires updates to records in several different datasets, dataset-level locking can cause poor performance. Since all affected datasets need to be locked in order to complete the transaction, performance may suffer while other users wait to lock the same sets.

An alternative to this situation is entry-level locking, which is invoked by setting the mode parameter on the DBLOCK call to 5 (unconditional) or 6 (conditional). This level of locking only locks the records in the dataset with a

FIGURE 3b.

Locking strategy for a batch program.

```
LOCK
READ TRANSACTION
WRITE TRANSACTION
UNLOCK
```

FIGURE 4

Locking strategy for online process.

```
LOCK
READ
UNLOCK

(user hits <ENTER> or <RETURN>)

LOCK
RE-READ
COMPARE
IN FIRST READ = SECOND READ
  WRITE
  UNLOCK
ELSE
  DISPLAY DATA FROM SECOND READ
  DISPLAY MESSAGE "Record has been updated —
   please make changes again"
  UNLOCK
```

In IMAGE, lock at the lowest level that still provides data protection.

key value equal to the value parameter in the lock descriptor array. Thus, users wishing to access other records in the dataset are free to do so. Although more complex to program, entry-level locking greatly improves performance when many users are accessing one database. *Program 2* shows a sample code for IMAGE entry-level locks.

IMAGE locking can be tricky, especially if several different application programs are accessing the same database. All programs accessing the database at one time should use the same level of locking. If your online program uses entry-level locking, then the batch running at the same time also must use entry-level locking. You also may wish to use the IMAGE modes that enforce locking, 1 and 5, to ensure that DBPUTs, DBUPDATEs and DBDELETEs have covering locks in place before they're executed.

Also, it's very important that, within one dataset, all entry-level locking be done on the same data item. If Program A locks on ACCOUNT-NUM = "123" and Program B locks on SALES-REP = "Tom Jones", the results will be the same as if dataset-level locking were used, because Program B can't check the records that Program A has locked to see if SALES-REP = "Tom Jones" appears in those records. To prevent this situation, have all programs lock on primary key data element.

In our shop, applications use various forms of locking for different needs. Our product file data maintenance application reads the product database and allows users to add product update records to a sequential file for later batch

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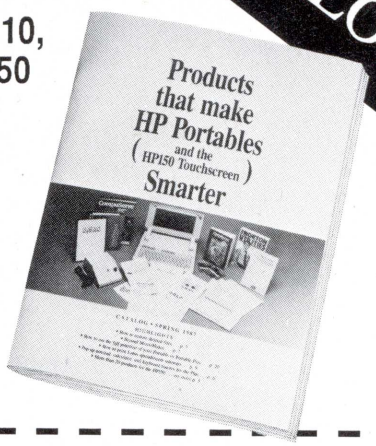
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processing. This application accesses the product database in a read-only mode, locking around the reads. The locks ensure that data doesn't change during the course of reading information from several different data sets. The locks are done at the data-item level for maximum throughput. The program also locks the sequential update file, writes records to it, then unlocks it to allow other sessions access. This file-level locking strategy ensures that transaction record sets won't be interleaved in the file.

Other applications lock KSAM files. Our warranty application tracks products on warranty in a KSAM file keyed by product number and serial number. Data-entry personnel may update product information with installation dates and warranty extension information. The warranty application locks around updates to the KSAM file to prevent overlaying of updates, and the lookup screen locks around reads to ensure that accurate information is displayed. The update program also locks a sequential update file so that records aren't interleaved in the update file.

Set-level locking is used in several of our applications. These applications usually have a smaller user base, perhaps 20 users (compared with up to 65 concurrent users for some other databases). Our quota and commission system, for example, is written in a 4GL that does implicit set-level locking. Performance on these applications has been good, because transactions are done against one set at a time.

Due to its poor performance, database-level locking isn't used in our shop. If control over the entire database is needed, an exclusive open is done. This way, since no other processes are accessing the database, locking isn't necessary. However, exclusive opens are used only for jobs run weekly or monthly to avoid scheduling problems.

Program 1.

```
Code to add a new record to a KSAM file, with locking.

 A000-PUT-KSAM-KEY.
*************************************************************
*    THIS PARAGRAPH ADDS A NEW RECORD TO THE KSAM FILE.     *
*************************************************************

     PERFORM B000-ASSEMBLE-KSAM-KEYS THRU B000-EXIT.
     PERFORM KSAM-LOCK THRU KSAM-LOCK-EXIT.
     PERFORM KSAM-WRITE THRU KSAM-WRITE-EXIT.
     PERFORM KSAM-UNLOCK THRU KSAM-UNLOCK-EXIT.

 A000-EXIT. EXIT.

 KSAM-LOCK.
*************************************************************
*  This paragraph is used to lock a KSAM file.              *
*************************************************************

     MOVE SPACES TO ERROR-FLAG.
     MOVE 1 TO TALLY.
     MOVE 500 TO PAUSE-PARM.
     PERFORM TRY-CKLOCK THRU TRY-CKLOCK-EXIT
             UNTIL TALLY GREATER THAN 5.
     IF KSTATUSKEY = "30"
               THEN MOVE "E" TO ERROR-FLAG,
                    MOVE FILENAME IN KFILETABLE TO ERR-FILE,
                    MOVE "KSAM ERROR ON CKLOCK" TO ERR-MSG,
               ELSE IF KSTATUS-KEY-1 NOT = "0"
                    MOVE "K" TO ERROR-FLAG,
                    MOVE FILENAME IN KFILETABLE TO ERR-FILE,
                    MOVE "KSAM FATAL FILE ERROR ON CKLOCK"
                         TO ERR-MSG,
                    GO TO 9999-FATAL-ERROR-EXIT.

KSAM-LOCK-EXIT.
    EXIT.

TRY-CKLOCK.
    CALL "CKLOCK" USING KFILETABLE,
                        KSTATUSKEY,
                        KLOCKCOND.

    IF KSTATUSKEY = "30" AND TALLY NOT GREATER THAN 5
       THEN CALL "PAUSE" USING PAUSE-PARM,
            ADD 1 TO TALLY
        ELSE MOVE 6 TO TALLY.

TRY-CKLOCK-EXIT.
    EXIT.

 KSAM-WRITE.
*************************************************************
*  This paragraph is used to write to a KSAM file.          *
*************************************************************

     MOVE SPACES TO ERROR-FLAG.
     CALL "CKWRITE" USING KFILETABLE,
                          KSTATUSKEY,
                          KSAM-REC,
                          KRECSIZE.

     IF KSTATUSKEY = "02" OR "22"
        THEN MOVE "E" TO ERROR-FLAG,
             MOVE FILENAME IN KFILETABLE TO ERR-FILE,
             MOVE "KSAM ERROR ON CKWRITE" TO ERR-MSG,

     ELSE IF KSTATUS-KEY-1 NOT = "0"
            THEN MOVE "K" TO ERROR-FLAG,
                 MOVE FILENAME IN KFILETABLE TO ERR-FILE,
                 MOVE "KSAM FATAL FILE ERROR ON CKWRITE"
                      TO ERR-MSG,
                 GO TO 9999-FATAL-ERROR-EXIT.

 KSAM-WRITE-EXIT.
     EXIT.


 KSAM-UNLOCK.
*************************************************************
*  This paragraph is used to unlock a KSAM file.            *
*************************************************************

     MOVE SPACES TO ERROR-FLAG.
     CALL "CKUNLOCK" USING KFILETABLE,
                           KSTATUSKEY.
     IF KSTATUSKEY = "31"
        THEN MOVE "E" TO ERROR-FLAG,
             MOVE FILENAME IN KFILETABLE TO ERR-FILE,
             MOVE "KSAM ERROR ON CKUNLOCK" TO ERR-MSG,
     ELSE IF KSTATUS-KEY-1 NOT = "0"
            THEN MOVE "K" TO ERROR-FLAG,
                 MOVE FILENAME IN KFILETABLE TO ERR-FILE,
                 MOVE "KSAM FATAL FILE ERROR ON CKUNLOCK"
                      TO ERR-MSG,
                 GO TO 9999-FATAL-ERROR-EXIT.

 KSAM-UNLOCK-EXIT.
     EXIT.
```

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When designing a new application for the HP 3000, it's extremely important to design a locking strategy early in the process. *The MPE Intrinsics* manual sections on FOPEN and FLOCK can provide more information about locking MPE files. For KSAM files, see the sections on CKOPENSHR and CKLOCK. For IMAGE databases, see Section 4, "Using the Locking Facility," for a discussion of locking levels.

As you design your strategy, consider these locking guidelines:

- *Locking on the HP 3000 is logical locking.* This means that all programs accessing a given file must lock to ensure adequate protection.
- *Only use conditional locking.*
- *Lock files or data sets in a predefined order.* Alphabetical order works well.
- *Never lock around user input.*
- *In IMAGE, lock at the lowest level that still provides data protection.* This is usually set-level for master sets, entry-level for details.
- *When doing entry-level locking in IMAGE, all programs must lock on the same data item.* The primary key works well as a lock item.

Hopefully, these rules and examples will allow you to design a strategy to meet your needs. That's sure to improve the reliability and performance of your programs. Most important, the guaranteed data integrity and improved response time will make you a hero with your users! — *Lisa Burns Hartman manages an internal business software programming team at Hewlett-Packard corporate headquarters, Palo Alto, CA.*

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Program 2.

Lock and unlock code for IMAGE databases.

```
 DB-LOCK.
*************************************************************
*  THIS PARAGRAPH PERFORMS AN ENTRY LEVEL LOCK.             *
*  IN CASE OF EXISTING LOCKS FROM ANOTHER                   *
*  PROCESS, IT WILL PAUSE 500 MSECS AND TRY AGAIN.  IT WILL *
*  PERFORM THIS LOOP 5 TIMES BEFORE GIVING UP.              *
*************************************************************

     MOVE SPACES TO ERROR-FLAG.
     MOVE 1 TO TALLY.
     MOVE 500 TO PAUSE-PARM.
     PERFORM DB-TRY-LOCK THRU DB-TL-EXIT UNTIL TALLY > 5.
     IF ICP-COND-CODE = 0
         GO TO DB-LOCK-EXIT.
     IF ICP-COND-CODE = 20 AND (ICP-MODE = ICP-MODE2 OR
                          = ICP-MODE4 OR = ICP-MODE6)
         MOVE "E" TO ERROR-FLAG
         MOVE "DATA BASE LOCKED OR CONTAINS LOCKS" TO ERROR-MSG
     ELSE IF ICP-COND-CODE = 22 AND (ICP-MODE = ICP-MODE4 OR
                                     = ICP-MODE6)
         MOVE "E" TO ERROR-FLAG
         MOVE "DATA SET LOCKED BY ANOTHER PROCESS" TO ERROR-MSG
     ELSE IF ICP-COND-CODE = 23 AND ICP-MODE = ICP-MODE4
         MOVE "E" TO ERROR-FLAG
         MOVE "ENTRIES LOCKED WITHIN SET" TO ERROR-MSG
     ELSE IF ICP-COND-CODE = 24 AND ICP-MODE = ICP-MODE6
         MOVE "E" TO ERROR-FLAG
         MOVE "ITEM CONFLICTS WITH CURRENT LOCKS" TO ERROR-MSG
     ELSE IF ICP-COND-CODE = 25 AND ICP-MODE = ICP-MODE6
         MOVE "E" TO ERROR-FLAG
         MOVE "ENTRY OR ENTRIES ALREADY LOCKED" TO ERROR-MSG
     ELSE
         MOVE "I" TO ERROR-FLAG
         MOVE ICP-BASE TO ERR-FILE
         MOVE "DBLOCK FATAL ERROR" TO ERR-MSG
         MOVE ICP-STATUS TO IMAGE-GEN-STATUS
         GO TO 9999-FATAL-ERROR-EXIT.
     CALL "DBUNLOCK" USING ICP-BASE
                           ICP-DSET
                           ICP-MODE1
                           ICP-DUMMY-ARG.

 DB-LOCK-EXIT. EXIT.


 DB-TRY-LOCK.

     CALL "DBLOCK" USING ICP-BASE
                         ICP-QUALIFIER
                         ICP-MODE
                         ICP-STATUS.
     IF ICP-COND-CODE < 0 OR = 0 OR > 25
         MOVE 6 TO TALLY
     ELSE
         ADD 1 TO TALLY
         IF TALLY < 6
           CALL "DBUNLOCK" USING ICP-BASE
                                 ICP-DSET
                                 ICP-MODE1
                                 ICP-STATUS
           CALL "PAUSE" USING PAUSE-PARM.

 DB-TL-EXIT. EXIT.


 DB-UNLOCK.
*************************************************************
*  THIS PARAGRAPH IS USED TO RELINQUISH ALL LOCKS           *
*  ACQUIRED BY PREVIOUS CALLS TO DBLOCK.  REDUNDANT CALLS   *
*  ARE IGNORED.                                             *
*************************************************************

     MOVE SPACES TO ERROR-FLAG.
     CALL "DBUNLOCK" USING ICP-BASE
                           ICP-DSET
                           ICP-MODE1
                           ICP-STATUS.
     IF ICP-COND-CODE = 0
         GO TO DB-UNLOCK-EXIT
     ELSE
         MOVE "I" TO ERROR-FLAG
         MOVE ICP-BASE TO ERR-FILE
         MOVE "DBUNLOCK FATAL ERROR" TO ERR-MSG
         MOVE ICP-STATUS TO IMAGE-GEN-STATUS
         GO TO 9999-FATAL-ERROR-EXIT.

 DB-UNLOCK-EXIT. EXIT.
```

■

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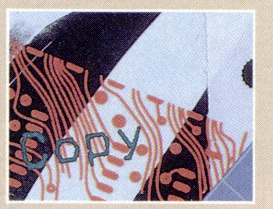
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WORKSTATIONS

Bob Youngquist

High-Performance Video Techniques

If you're like me, you go through life wondering why so many programs are so slow. Some users grumble about the ascendency of high-level languages. Many assume that high-level and inefficiency are practically synonymous, but in many applications this just isn't true.

You can have significant performance gains with simple optimizations within the bounds of the high-level language.

This is especially true in the HP PASCAL environment. Extensions to the language and a library of high-quality routines have made assembly language totally unnecessary for many applications.

In particular, text display intensive programs like editors benefit greatly from optimizations to their screen write routines. The stately pace of the PASCAL editor's screen updates, for example, is not a function of hardware limitations, but rather the result of certain design decisions. A different approach would complicate the implementation somewhat, but would yield vast improvements in performance. This article illustrates some of these video techniques implemented entirely in PASCAL.

Portability vs. Performance

Increases in performance often are the result of exploiting specific characteristics of the hardware, which raises the issue of portability. This is particularly true with HP workstations that use a variety of different monitors and video interface options. No single technique will yield maximal performance for all monitor configurations. This necessitates duplication of a certain amount of code, but with proper modular program design, this requirement needn't be burdensome.

Like disc file I/O, screen output can be implemented for portability using the standard write procedure, which takes as its parameters a **file** variable and a **char** or **string** variable. The default **file** variable for this procedure is output (the console). This procedure writes to the console a character at a time and also updates the cursor position. Unfortunately, the overhead involved slows output. In many video-intensive applications, this level of performance simply is inadequate, particularly with large monitors like the 19-inch 98782A.

The video hardware available on the 9000 Series may be divided into two basic types, those with an alphanumeric plane and those without. The 9836 and 9816 video display hardware

Increases in performance often are the result of exploiting specific characteristics of the hardware, which raises the issue of portability.

has an alphanumeric plane for the representation of text. The display appears in the 68xxx address space as a memory-mapped I/O device. In this arrangement, a character on the screen is represented by a word of memory in the display buffer. The first byte of the word contains the color and screen attribute information (inverse video, for example) and the second byte stores an ASCII value for the desired character. In PASCAL, this word of memory can be represented by a record.

```
const
  screenaddr   = 5316608; {address
    of 9836 screen memory}
  nooflines    = 25;
  linelength   = 80;
  defaultcolor = #0;

type
  character    = record
                   attribute : char;
                   ch: char;
                 end;
  screentype   = array[1..nooflines,
    1..linelength] of character
```

The video memory can be represented as an array of type character. Since the video memory is at a fixed address, an absolute variable can be declared to address this area:

```
var
  crt[screenaddr] : screentype;
```

Writing characters on the screen is simply a matter of poking them into the appropriate address, which can be done by



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making assignments to this absolute variable. The following code fragment would place a normal video green character on the screen of a 9836 at the position indicated by the variables **row** and **col**.

```
crt[row, col].ch := 'a';
crt[row, col].attr := defaultcolor;
```

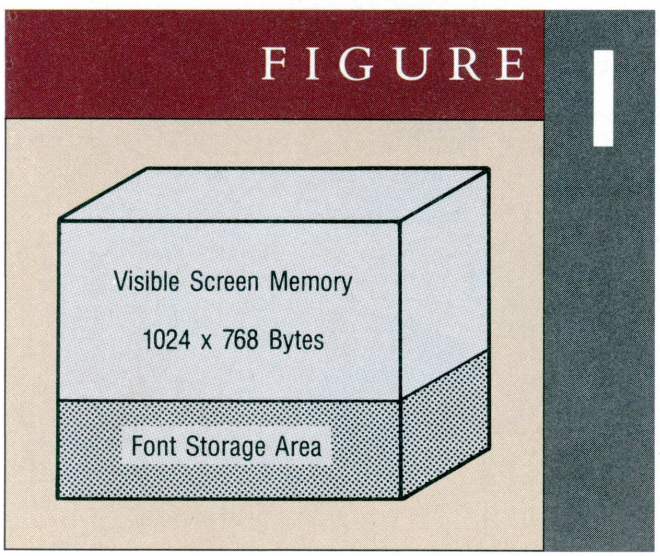
In a video-intensive application like a text editor, updating the screen can be done a line at a time using the **moveleft** procedure. This method provides excellent screen update rates due in part to the efficiency of the **moveleft** procedure. It is implemented using an assembly language routine that employs the 68000 **movem** instruction. This instruction employs eight registers to move 32 bytes at once.

In designing a text editor for in-house use, the approach I used was to define a virtual screen and a physical screen. The physical screen (represented by the variable **crt** above) was updated from the virtual screen where all editing operations took place. When a change occurred in any line in the virtual screen, the physical screen was updated as a background task. This occurred a line at a time using the following procedure:

```
procedure updatecrt(row : integer);

begin
  moveleft(screen[row,1], crt[row,1], cols * 2);
end {of updatecrt procedure}
```

The first two parameters in the **moveleft** procedure are the source and destination addresses. The third is the number of bytes to move. This value is derived from a constant **cols** that defines the width of the screen. This value is multiplied by two, because each character is stored in a two-byte record.



High-Resolution Graphics Option Video Memory Map.

Of course, poking data directly into video memory doesn't affect cursor position; it must be updated separately. Fortunately, the PASCAL compiler provides the procedure **gotoxy** (one of the UCSD extensions) for this purpose.

This procedure can be used most efficiently if the program maintains a Boolean cursor update flag to signal when the cursor should be repositioned. Often, writing to the display requires no cursor update at all; thus, the needless effort of cursor update is eliminated.

Bitmapped Video

The 300 Series offers several display options. The high-resolution graphics option with the 19-inch screen has no alphanumeric plane. Characters are placed on the screen in graphics mode. This normally would exact a noticeable performance penalty since more data must be moved in graphics mode to create a character. In this case, each character is 16 by eight pixels by three planes resulting in a move of 48 bytes to generate one character.

However, the high-resolution graphics option possesses some special hardware called the Window-Mover. It is designed to move a block of memory from any address in the video frame buffer to any other address in the buffer. The frame buffer is 1,024 by 1,024 bytes, but only 768 by 1,024 bytes are used for the display (*see Figure 1*).

One of the uses of this extra frame buffer memory is font storage. During initialization of the display hardware, the operating system places the bit patterns for the character set

Program 1.

```
procedure writeline(str:str255; x, y : shortint; color : integer);

const
  char_height   =  16;
  char_width    =   8;
  char_buf_line = 768;
  status_mask   =  15;

var

{various ports defined as absolute variables    - see Pascal 3.1 System
Designers Guide pg 305}

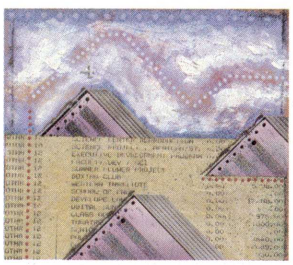
  sourcex [hex('005640F2')]:shortint; { positions of source and }
  sourcey [hex('005640F6')]:shortint; { destinations on the     }
  destinx [hex('005640FA')]:shortint; { screen }
  destiny [hex('005640FE')]:shortint;
  width   [hex('00564102')]:shortint; { dimensions of the block }
  height  [hex('00564106')]:shortint; { to be moved             }
  trigger [hex('0056409C')]:char;     {trigger block move       }
  status  [hex('00564044')]:char;     {move status in 4 LSB's   }
  i:integer;

begin
  sourcey := char_buf_line; {the screen line where chars are stored }
  width := char_width;          {width of a char cell }
  height := char_height;        {height of a char cell }
  destiny := (ypos - 1) * char_height;  {calculate screen line to put char
on }
  for i := 1 to strlen(str) do {write each char in string }
   begin
    repeat until binand(ord(status),status_mask) = 0;{ wait until mover is
ready }
    destinx := (xpos+i-1) * char_width;  {calculate x position of char }
    sourcex := ord(str[i]) * char_width; {calculate x position of source }
    trigger := chr(color);   {selects color and triggers move 1 - white 3-
yellow etc.}
  end;
  repeat until binand(ord(status),status_mask) = 0;  {wait until mover is
finished }
end;
```

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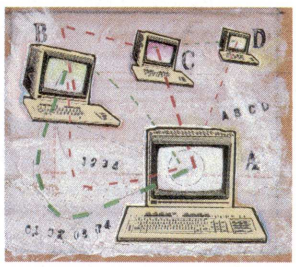


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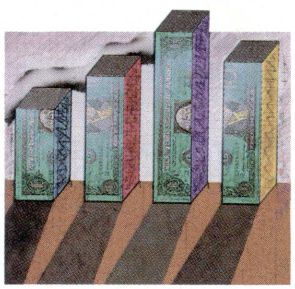
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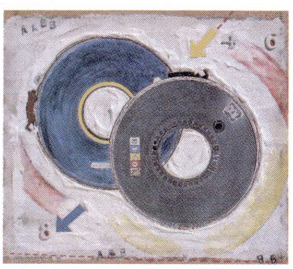
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from ROM into this memory. Since it is accessible by the Window-Mover, characters may be written on the screen very quickly by merely calculating the offset in the frame buffer for a particular character and moving this block of memory into the visible screen using the Window-Mover hardware. The Window-Mover is accessed via ports, which may be defined as absolute variables. The code fragment in *Program 1* writes a line of text using the Window-Mover.

Since the Window-Mover operates asynchronously, the status of the device must be checked in a repeat loop before the trigger port is set to the appropriate value or unexpected.

Due to the efficiency of this highly optimized hardware, which is capable of moving 30 million pixels per second, our in-house editor updates the 19-inch screen extraordinarily fast; even faster than the lowest level functions of the operating system and roughly nine times faster than the PASCAL editor.

Unlike the alpha plane, the graphics plane allows text on the same screen to be written in different colors simultaneously. The color is chosen by altering the value of the trigger port. I have used this capability in our multiwindowed editor to differentiate between windows by assigning one of four different colors to each window and ensuring that no adjacent windows appear in the same color. This technique is highly functional and attractive.

The greatest performance gains in video throughput are obtained using alpha plane video hardware such as in the 9836. A full-screen refresh such as that which occurs when an editor pages through a document, happens so quickly the time taken can't be measured. The graphics hardware using the Window-Mover, although not as fast, does yield impressive performance gains.

In a typical editor application of these techniques, expect an 800 percent improvement in video refresh. For example, the PASCAL editor takes .8 seconds to refresh a full screen of text while our in-house editor requires only .1 seconds to refresh the entire 48-line screen on a 9000 350 workstation.

For highly text display intensive applications, the screen refresh rate is a limiting factor in overall throughput. However, in any program, screen performance plays an important part in our subjective appraisal of its performance. Programs that snap to attention instantly are more pleasing, more enjoyable to use and more efficient than those that meander across the screen. In any case, no matter how sophisticated the underlying code, a glossy surface never hurts. —*Bob Youngquist is president of Insight Instrument Corp., Fort Erie, Ontario.*

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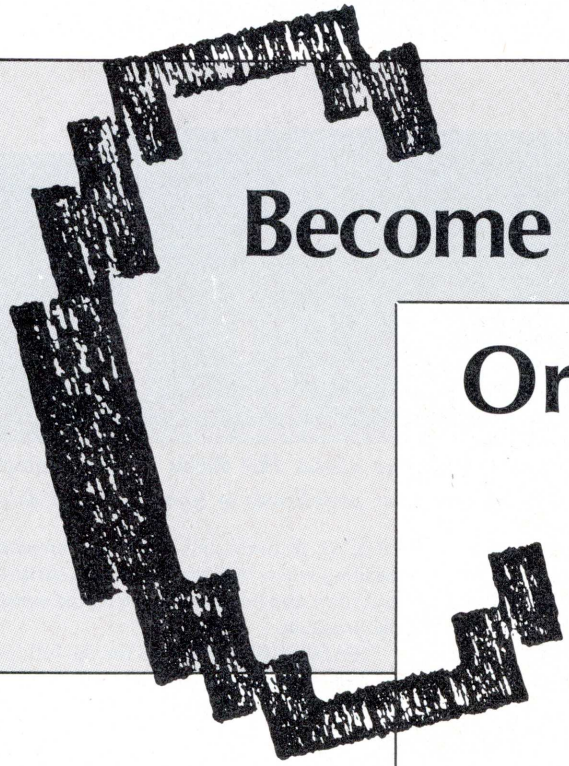
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PURVIS Provides Interface For HP 9000

PURVIS Systems Incorporated has introduced a MIL-STD-1397 interface for the HP 9000. The HP/NTDS interface allows the HP computers to communicate directly with tactical computers or peripherals, using MIL-STD-1397 functional and electrical characteristics, for the purpose of transferring digital data.

The design and functional capabilities of the HP/NTDS interface enables the host computer to accommodate the real-time requirements of tactical systems by emulating the NTDS processor's I/O controller functions, making the HP/NTDS suitable for laboratory-based simulation/stimulation systems, training devices, I/O channel monitoring or data acquisition systems.

The HP/NTDS, MIL-STD-1397 interface ($11,000) is a dual-channel, 19-inch rackmountable unit that interfaces to the HP computer via a GPIO interface card. The unit supports 16- and 32-bit, half- or full-duplex I/O transfers in all categories of operation. The HP/NTDS interface supports normal and forced external function outputs, and normal and forced external interrupt inputs.

The HP/NTDS interface is available in three versions to support the Type A (Slow), Type B (Fast) and Type C (ANEW) classifications. Each version meets the parallel data transfer rates specified in MIL-STD-1397. In addition, Types B and C versions are designed with differential type receivers to be in compliance with MIL-STD-1397.

Contact Roy Hiipakka, PURVIS Systems Inc., 1272 W. Main Rd., Middletown, RI 02840; (401) 849-4750.

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AirMail Integrates With ACCESS

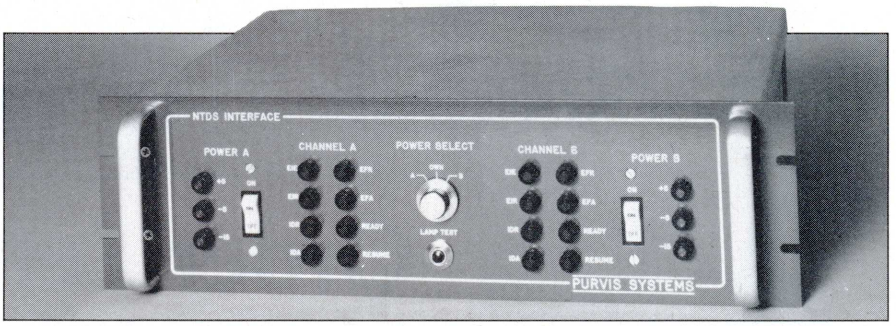
MiniSoft announces the only electronic mail system designed to operate on the HP 3000, HP 1000, HP 150, HP 9000, DEC VAX and IBM host computer systems, and Macintosh PCs.

AirMail features distribution lists, message archiving, message forwarding, full-screen editing on any terminal or PC and automatic mail notification. It also includes an interface to HPDESKMANAGER.

AirMail integrates with the Universal ACCESS operating environment. It takes advantage of Universal ACCESS's file transfer, windowing and printing features. On any terminal or PC, ACCESS users can run AirMail in one window while continuing to work on other applications in other windows. AirMail will monitor the mail system and alert the user to any incoming messages. Once the messages are answered, AirMail users can return to their previous applications.

Contact MiniSoft Inc., 16315 NE 87th, Suite B101, Redmond, WA 98052; (206) 883-1353 or (800) 682-0200.

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PURVIS Systems' MIL-STD-1397 interface allows HP 9000s to communicate directly with tactical computers or peripherals to transfer digital data.

MJH Systems Announces PASFORM Upgrade

MJH Systems has announced a new release of its PASFORM PASCAL source-code formatter, which incorporates a fully integrated Cross Referencer and a host of new formatting options. With the additions in Version 3.0, PASFORM has evolved into a full-functioned PASCAL source-code management system that consistently runs across the entire HP computer line.

The PASFORM system ($395—$1,595) allows PASCAL source code to be transformed to and from virtually any format within minutes. Source code is parsed, syntax errors reported, code measurements (metrics) collected, and reformatted and/or recapitalized code generated in less time than the corresponding compiler takes to process the same information. Include files are opened and parsed, if they can be located. PASFORM may be used to collate distributed PASCAL source into one compatible, formatted, capitalized source file.

The Cross Referencer Option has been integrated into the system. PASFORM now can produce a comprehensive, cross-reference listing of your distributed PASCAL source consisting of an index of the referenced Include files in the system, an index of the procedures, functions, modules and programs showing where they're defined within the code; a detailed breakdown of each procedure, function, module and program showing parameters, local definitions, global references, and references to built-in PASCAL features; and a symbol summary detailing where each type, constant, variable, procedure and function are referenced within the program.

PASFORM is available for the full line of HP computers — HP 9000 Series 200/300/800, HP 1000 RTE, HP 3000 MPE and MPE/XL.

Contact MJH Systems, 9375 Albany, Boise, ID 83704; (208) 327-0011.

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EIT Announces HP ScanJet Interface

Electronic Information Technology (E.I.T., Inc.), developer and marketer of the EIT pc-FAX virtual facsimile modem board, has announced graphics software support for the HP ScanJet desktop scanner as part of its standard product package.

EIT pc-FAX is a multifunctional modem board for IBM PC, PC/XT, PC/AT and compatible single-user PCs. It provides two-way communication between PCs and Group II facsimile machines, and also performs binary file transfer between PCs equipped with the EIT product.

The ScanJet interface provides a means of inputting documents that are intended for FAX transmission. Using EIT pull-down window software, a user may scan an image and then broadcast it to Group III facsimile machines.

Files created by this interface are 100 percent compatible with all EIT graphic handling and text-and-image merging features as well as the background graphics-to-FAX file conversion. The ScanJet also may be used with the HP Scanning Gallery software.

Contact John Carlomano, National Sales Manager, E.I.T., Inc., 25 Just Rd., Fairfield, NJ 07006; (201) 227-1447; FAX: (201) 227-4091.

Circle 385 on reader card

TOPHAT-POS Meets Point-Of-Sale Needs

Top Hat Systems, Ltd., a supplier of computer software for the restaurant industry, has released its TOPHAT-POS computer software system to meet all point-of-sale and floor-management needs of restaurants.

The TOPHAT-POS system provides cash management, staff tracking, order entry, kitchen/bar order transmission and detailed management reporting. Additionally, online personnel/cash auditing methods can eliminate cash theft and free-food giveaways.

Structurally, the TOPHAT-POS system utilizes personal microcomputers at the point-of-sale. All transactions into the point-of-sale system are performed using touchscreen input technology.

TOPHAT-POS supports the TOPHAT Custom Touchscreen and controller, and the Interaction Systems touchscreen system (for use on any PC-compatible), HP Vectra (with touchscreen bezel), HP 150, HP Touchscreen II, PC-compatibles with OEM monitor and other third-party touchscreen systems.

The TOPHAT-POS standalone system ($1,995) requires MS-DOS 2.11 or greater, 640K RAM and hard disc capacity. The networked TOPHAT-POS ($3,995) requires each terminal to operate under MS-DOS 3.1 or greater, 640K RAM and floppy or hard disc boot capability.

Contact Top Hat Systems Ltd., 2422 Rand Morgan, Suite E, Corpus Christi, TX 78410; (512) 241-6110.

Circle 367 on reader card

Reflection 7 R3.0 Adds HP 2623 Emulation

Walker Richer & Quinn Inc. has added several enhancements to Reflection 7 Release 3.0. Emulation of the HP 2623 monochrome graphics terminal now is included with Reflection 7 in addition to the color graphics and Tektronix and alphanumeric terminal emulation provided in the past.

Reflection 7 automatically senses and addresses up to 64 KB of expanded memory, providing the memory board complies with the Lotus/Intel/Microsoft (LIM) standard. This frees memory for use by DOS or other DOS applications. Reflection 7 ($399) also lets users change how their keyboard is laid out by *Remapping*, the assigning of one or more functions or text strings to a key.

Reflection 7 PLUS ($449) includes the capability to use an HP 3000, VAX/VMS or any UNIX system as a backup device for PC files. The PLUS option also includes drivers so that Reflection can communicate through 3COM, Novell, Ungermann-Bass and Nestar LANs.

Reflection 7 requires an HP Vectra, IBM PC or PS/2 or compatible.

Contact Walker Richer & Quinn Inc., 2825 Eastlake Ave. E., Seattle, WA 98102; (206) 324-0350.

Circle 365 on reader card

Informix-Turbo Available For UNIX-Based Systems

Informix Software Inc. has announced that Informix-Turbo, its high-performance, fault-tolerance database server, is now available for the HP 9000/840 and many other leading UNIX-based systems.

Informix-Turbo, the first fault-tolerant database server for UNIX systems, is an optional database server that provides a 200 percent increase in transaction-processing performance by incorporating several optimizing techniques such as UNIX System V shared memory, query optimization, and an enhanced raw input/output (I/O) capability to manage heavy processing loads and speed access for users.

Fault tolerance insures that data won't be lost in the event of a system crash, and the system quickly and automatically can be restarted without the need for file system integrity checking.

Contact Informix Software, Inc., 4100 Bohannon Dr., Menlo Park, CA 94025; (415) 322-4100; FAX: (415) 322-4571.

Circle 382 on reader card

FLEXIBASE Enhances IMAGE Database Support

Proactive Systems has announced several new modules in its FLEXIBASE database support system for IMAGE users.

Additional FLEXIBASE ($1,900 for Micro3000 users) functions cover:

- *Automatic creation of test databases by sampling of larger databases.* (Logical subsets of records are extracted under user control.)
- *Automatic management of database capacities to ensure users never exceed defined capacities.* The user specifies upper, lower and target percentages of full capacity and the system automatically will keep entry counts within the limits.
- *New set repack module* (up to 15 times faster than the old).
- *New fast database copy module.*
- *More parameters reported in the DIAGNOSE database performance analysis module* (better progress reporting, improved user interface and more).

These features complement the existing database change, capacity management, performance diagnosis, database repair and other functions.

Contact Randy Safier, Proactive Systems, P.O. Box 7102, Bloomfield Hills, MI 48302; (800) 356-7117, in MI (313) 333-7200.

Circle 383 on reader card

CrossComm Teaches Using ILAN-I

CrossComm Corporation has released an application note entitled, "Cost Effective Solution for LAN Integration and Corporate-Wide Data Communications." The illustrated eight-page note describes a means of integrating multiple subnetworks into a single corporate network using ILAN- 1, a unique modular systems approach to LAN interconnectivity.

The note explains how multiple networks including Ethernets, StarLANs, Token Rings, Fiber and T1 links can be combined. It includes information about both local and remote LANs explaining how multiple protocols and multiple standards can be mixed to create a company or campus-wide communications path.

Also described is the concept behind ILAN-1.

Contact CrossComm Corp., P.O. Box 699, Marlborough, MA 01752; (617) 481-4060.

Circle 366 on reader card

ENIGMA Provides User-Friendly Security

Cappcomm Software Inc., a developer and marketer of computer software products, has announced the availability of ENIGMA, its recently developed computer security package.

ENIGMA is a user-friendly, state-of-the-art computer security system utilizing data encryption (DES) conforming to the National Bureau of Standards (NBS-FIPS 46) and ANSI standard X3.92 and/or authentication conforming to ANSI Standard X9.9. It uses a key management module that adheres to the X9.17 ANSI standard.

ENIGMA ($50,000 license fee) features a generalizer report writer, user hotline, help screens, on-site user training and installation assistance, and an on-going maintenance program. ENIGMA is written in C. Major banks, Fortune 1000 corporations and government agencies would be the program's primary prospects.

Contact Cappcomm Software Inc., 26 Journal Sq., Suite 1003, Jersey City, NJ 07306; (201) 795-1500.

Circle 380 on reader card

SELERIS PC Eliminates CAD Plotter Bottleneck

Western Automation Laboratories Inc. recently announced the release of a new solution to the CAD plotter bottleneck: SELERIS PC, an intelligent, internal plotter controller and high-speed serial COM port on one PC card. It plugs directly into an open expansion slot inside any IBM PC, XT/AT or compatible and PS/2 Models 25 and 30.

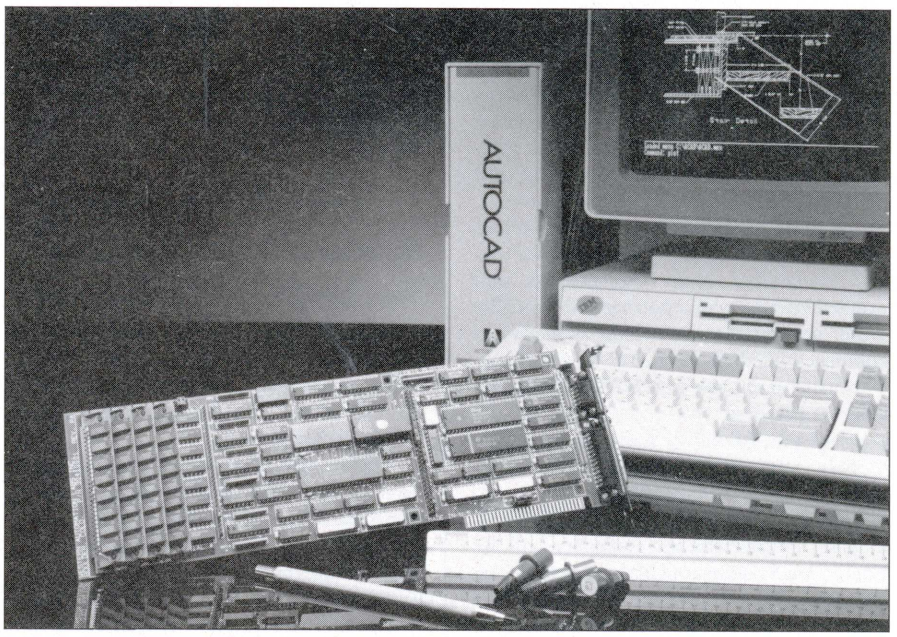
SELERIS PC frees the PC-based CAD user's workstation from "plotter wait," which occurs when interactive control of the plotter brings an otherwise powerful workstation to a halt. The new SELERIS PC receives plot data from a PC at the rate of 115,000 baud. Therefore, the processing speed of the CAD workstation is no longer limited by a standard 9600 baud serial port.

SELERIS PC ($595) contains an onboard, 8-MHz 8088 microprocessor and 512 KB to 8.5 MB of upgradeable RAM. To the computer, the SELERIS PC appears as a standard serial communications port. Unlike a standard serial port, however, it's capable of receiving data at up to 115K baud.

SELERIS PC is designed for use with PC-based CAD or business graphics systems, and is compatible with all major plotters including HP, CalComp and Houston Instrument. It supports CAD software packages including AutoCAD, VersaCAD, CADVANCE, MegaCADD, DataCAD, GenericCAD, FastCAD and more.

Contact Western Automation, 1700 North 55th St., Boulder, CO 80301; (303) 449-6400; FAX: (303) 939-8844.

Circle 369 on reader card



The SELERIS PC plugs into an open expansion slot inside any PC XT/AT or compatible computer, appearing as a standard serial communications port.

ISChart/3000 Now Offers Faster LaserJet Output

Interactive Solutions Corporation has announced the availability of Version 1.05 of ISChart/3000, a complete graphics system for the HP 3000.

Version 1.05 adds two new graph formats (step chart and combination stacked/clustered bar) and 28 new text fonts. In addition, a new output driver is added, which improves LaserJet output speeds three to five times over other host-based graphics packages.

ISChart/3000 supports 18 graph formats, which include all standard business graphics formats, as well as a text-only format. It also provides a drawing capability, allows for combined text and graphics, and has built-in analytical and statistical functions. ISChart/3000 runs interactively in batch mode or easily can be integrated into other applications. It satisfies the full range of presentation and production graphics requirements.

Contact Interactive Solutions Corp., Route 1, Box 500, Eastsound, WA 98245; (206) 376-5085.

Circle 387 on reader card

Microware Releases New OS-9/XCC

Microware Systems Corporation has announced a new OS-9/XCC Cross C Compiler for HP Series 300 workstations. Series 300 users now can assemble, link and compile OS-9/680x0 C programs under the HP-UX operating system for real-time operation on OS-9-based systems.

OS-9/XCC provides extensive Berkeley 4.2-oriented libraries, complete with standard I/O and MATH routines, to maximize portability between the HP-UX and OS-9 operating systems. Users are able to develop new or existing HP-UX-resident C programs with OS-9/XCC 680x0 system components such as C Executive, Preprocessor, One-Pass C Compiler, Optimizer Utilities, Macro Assembler and Linker for real-time OS-9 execution.

OS-9/XCC programs compiled on the Series 300 produce position-independent, reentrant, compact-executable object code for the OS-9 operating system. Users also have the option to output 680x0 assembler source, linker input or executable binary files.

Communication packages are available from Microware to facilitate hardware links between OS-9 and HP Series 300 workstations. The OS-9/ESP Ethernet Support Package provides Ethernet TCP/IP communications, supporting both FTP and Telnet to facilitate file transfer and remote login to both host and target systems. The COM Communication Package provides high-speed serial communications to and from OS-9 systems and the HP Series 300. Both packages offer compatibility for the transfer of C programs written with OS-9/XCC.

Contact Microware Systems Corp., 1900 N.W. 114th St., Des Moines, IA 50322; (515) 224-1929.

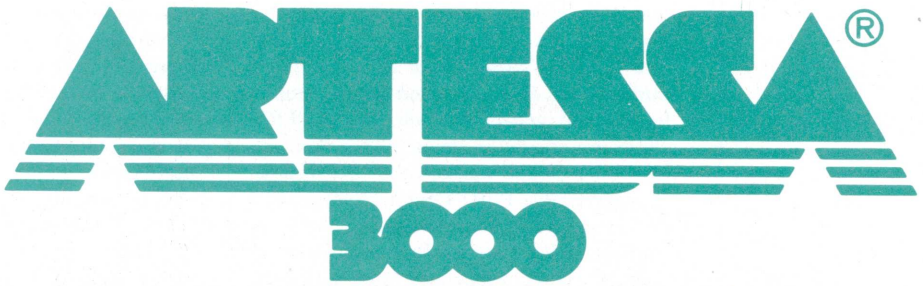
Circle 384 on reader card

PERT Option Meets High-End Planning Needs

InstaPlan Corporation has begun shipping "Classic PERT," an $80 add-on to InstaPlan's project planning and presentation software.

PERT (Project Evaluation and Review Technique) charts do a clear job of showing dependencies — tasks that depend on the completion of other tasks. This makes them useful for depicting larger projects that typically consist of large numbers of interrelated tasks. PERT charts frequently are used in construction, engineering and aerospace planning.

Generating a PERT chart is fully auto-



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matic. No layout or design work is necessary. The PERT chart is created solely from input into InstaPlan's simple and logical activity outline. Each chart is printed with a symbol legend and approval block. Large PERT charts are printed in strips, which then are assembled on the wall or other flat surface.

The Classic PERT Option requires a PC or compatible, 640K RAM and hard disc. It supports HP's LaserJet Plus and Series II printers, IBM Proprinter and Graphics Printer, Epson FX/MX/RX/LQ, Okidata Plug'n Play 92/3, Microline 192/3, 292/3 and Toshiba 351.

Contact InstaPlan Corp., 655 Redwood Hwy., Suite 311, Mill Valley, CA 94941; (415) 389-1414.

Circle 381 on reader card

Tymlabs Offers HP Emulators For Macintosh

Tymlabs Corporation recently announced its new Session family of HP terminal emulation software for the Macintosh. The Session products support communications with the HP 3000, 9000 and 1000 Series computer systems.

Business Session ($199) is a direct upgrade from the former Mac2624, Tymlabs' HP 2392 block mode terminal emulator. Running on the Macintosh, Business Session provides online access to the data, applications and storage capacity of the HP 3000. The emulator implements all HP terminal configuration, keyboard and display features, while also providing the flexibility of a Macintosh application.

Business Session V3.0 is compatible with MultiFinder, featuring a resizable window and background file transfer. When running under MultiFinder, users can activate other applications while terminal operations and file transfers are in progress.

Graphic Session ($299) adds HP 2393 graphics capability to Business Session, enabling users to run any graphics application that supports an HP graphics terminal. The emulator offers complete compatibility with HP 3000 programs such as DSG/3000, HPDRAW, HPMAP and HPEASYCHART, and with low-level graphics procedures such as those provided by HP's AGL on the HP 3000; CGL in the contributed software library for the HP 3000; and DGL, AGP and StarBase on the HP 9000.

Like an HP graphics terminal, Graphic Session can display text and graphics together in a single, movable, resizable window. It supports the Macintosh mouse as an input device, emulating the HP mouse or pen stylus. For graphics output, the package supports the connection of an HP plotter in eavesdrop mode and also can plot images displayed on the screen using Apple's LaserWriter or ImageWriter.

Featuring the capabilities of Graphic Session, Color Session ($399) also supports color text and graphics, providing HP 2397 terminal emulation.

Contact Tymlabs Corp., 811 Barton Springs Rd., Austin, TX 78704; (512) 478-0611.

Circle 379 on reader card

GaS STATION Designs GaAs MMICS

Compact Software Inc. has introduced GaS STATION, a graphics layout package that can be used in conjunction with electrical and/or optical simulation software to design GaAs MMICs, millimetre wave circuits and optoelectronic components.

The software can be used to generate arbitrary patterns in IC industry standard GDS-II data format. Any of the 64 layers can be shown in one of 256 available colors. In addition, its polygon handling capability and layout software can generate and read hierarchically flat, geometrically defined SUPER-COMPACT or Touchstone circuit files. GaS STATION uses micron units and ranges from 0.1 to 100,000 microns.

Highlights include comprehensive curve-generating capability; mouse-driven, menu-orientated graphics command input; executable command list; full cell-based hierarchical design; auto-generation of Touchstone and SUPER-COMPACT shapes; optional display of electrical schematic symbols; external control from a batch file; GDS-II pattern data format output and software to control tape drive peripherals.

Hard copies of designs can be generated with the HP Vectra on an HP LaserJet.

Contact Jerry Brocklehurst, Compact Software Inc., 483 McLean Blvd. & 18th Aves., Paterson, NJ 07504; (201) 881-1200.

Circle 378 on reader card

TWAICE For 386 Now Available

Logicware Inc., a company that provides expert system development tools to corporate MIS and DP departments, began shipping its TWAICE expert system shell for 386-based hardware, running in 386 protected mode under MS-DOS.

The TWAICE shell has been available since 1985 on IBM mainframes, DEC VAXs and M68000 workstations. The 386-based hardware is fully compatible with the HP 3000 and other mainframe and workstation

implementations such as Apollo, Tektronix 4404-6, CDC Cyber 180 and more.
Contact Logicware Inc., 237 Park Ave., Suite 2100, New York, NY 10017; (212) 551-3536; in Canada: Logicware Inc., 5915 Airport Rd., Suite 200, Mississauga, Ontario, L4V 1T1; (416) 672-0300.

Circle 376 on reader card

SofTrak Systems Announces MicroTrak Upgrade

With the MicroTrak project scheduling system over four years old, SofTrak Systems has announced a new upgrade encompassing many features current users have been requesting. In addition, the upgrade adds some features not found in other inexpensive project management software.

The most unique new feature in MicroTrak ($595 for PC-DOS, MS-DOS) is the Overuse/Underuse Report. For each resource, users may specify a maximum daily limit amount. Then, based on the way they've allocated resources to the individual activities in their schedule, MicroTrak will calculate daily, weekly and monthly resource use. It also reports how much each resource is being overused or underused as compared to the resource's maximum daily limit.

Other improvements to MicroTrak include two other new reports and more sorting and selecting options to make reports as specific or broad as necessary. Resource tracking, scheduling subdividing, and overall ease of use also have been enhanced.

MicroTrak is available for IBM PC XT/AT and MS-DOS compatible computers, IBM PS/2, and computers running UNIX, XENIX, or VMS.
Contact SofTrak Systems, 1574 W. 1700 S., Suite 2C, P.O. Box 16750, Salt Lake City, UT 84116; (801) 973-9610.

Circle 375 on reader card

ACUWARE Announces AutoCAD-Based Product

ACUWARE, Inc. recently announced AutoPE STRUCTURAL, a complete AutoCAD-based application program.

The program helps structural engineers quickly create design plans by automating most of their drafting tasks. Framing and floor, foundation and site, tilt-up panel, and details and sections are the types of drawings it makes.

AutoPE draws on extensive, industry-specified material libraries of steel, concrete (precast and poured), timber and masonry accessed through AutoLISP, MACROS and C programs. It provides engineering offices

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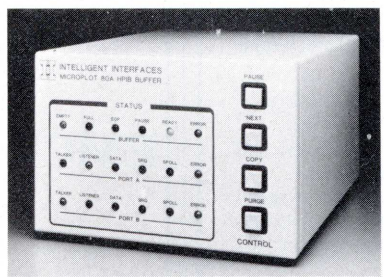
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MicroPlot 80A HPIB Buffer
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Three models save you money while you're saving time. The **MicroPlot 80** HPIB buffer offers intelligent performance at below dumb buffer prices. Copy, Pause, Multiple Plot Queuing, and Purge features are standard. Expandable to 512k, the MicroPlot 80 is ideal for large printing or small plotting applications. The **MicroPlot 80A** includes all MicroPlot 80 features plus full buffer and I/O status indicators, custom firmware support, and Pen-Up pause mode. Memory expansion to 2MBytes and compatibility with major software packages make the MicroPlot 80A the logical choice for CAD/CAM/CAE applications. The **MicroPlot 55** Serial buffer gives RS-232 interface users all the operational features of the MicroPlot 80A PLUS automatic "learn end-of-plot" and manual "mark end of plot" features.

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with reduced drafting time, increased drawing quality and output, quick revision response time, effective CAD management and drafting standards, design/construction data coordination and a fast learning curve.

AutoPE STRUCTURAL ($1,995) features an AutoPE tablet template, a special Wall Chart of the system's drafting standards, eight 5¼-inch or 3½-inch floppy discs and a 200-page *Training and Reference Guide.* The minimum software/hardware requirements are AutoCAD v2.6 (supports Release 9), + ADE3, MS-DOS/PC-DOS v2.0, IBM PC XT/AT-compatible hard disc and 11 x 11 digitizer.

Contact ACUWARE, 522 S.W. Fifth Ave., Portland, OR 97204; (503) 222-6661.

Circle 374 on reader card

LaserCard For Printing On IBM System/36, 38

I-O Corporation has announced the 8200HP LaserCard, an internal interface card that will enable the HP LaserJet Series II printer to be used with IBM System/36 or System/38 midrange computers.

The LaserCard ($995) makes the LaserJet Series II a quick, noise-free printer for data and word processing applications. Unlike external protocol converter boxes, which send data to the LaserJet through its parallel or serial ports, the I-O 8200HP LaserCard connects through the LaserJet Series II's internal I/O port, increasing the transmission speed of data and leaving the LaserJet's serial and parallel ports available for connection to PCs.

The LaserCard features Auto DP Mode, enabling automatic selection of the appropriate font and page orientation to allow printing of 80-, 132- or 198-column data processing output.

The LaserCard automatically changes from word processing to data processing mode. To the IBM host, the LaserCard with a LaserJet is plug-compatible with the IBM 5219 printer, providing features of IBM's 3812 printer.

The I-O 8200HP LaserCard enables IBM System/36 or System/38 users direct access to many LaserJet fonts by specifying an IBM TypeStyle number in a DisplayWrite/36. HP cartridges A,B,D,E,G,H,L,M,N,Q and R are supported in DisplayWrite/36. The LaserJet fonts can be accessed in data processing using RPG programming.

Contact I-O Corp., 2256 South 3600 West, Salt Lake City, UT 84119; (801) 973-6767; FAX: (801) 974-5683.

Circle 373 on reader card

ROGI Offers Business Solutions

Brant Computer Services Limited has announced the release of the ROGI Financial Planning System for personal financial planners.

ROGI (Rate of Growth of Investable Capital) is designed to help standardize the problem definition phase of personal financial planning. Developed using third-, fourth- and fifth-generation (artificial intelligence) technologies, ROGI combines a database system with an expert system to produce a comprehensive plan document.

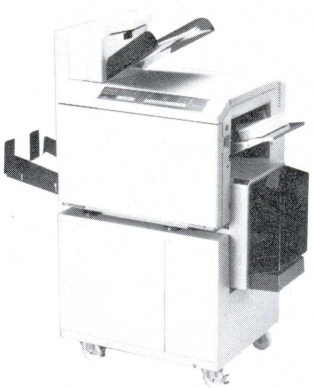
ROGI takes into consideration not only financial information, but also investment attitudes and lifestyle priorities. The system's strategy recommendations provide the

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For heavier output, the S-6000-II is another DeRex field-proven, high speed, reliable printer. At 75 pages per minute, with both portrait and landscape orientations, it provides great versatility of output at higher speeds.

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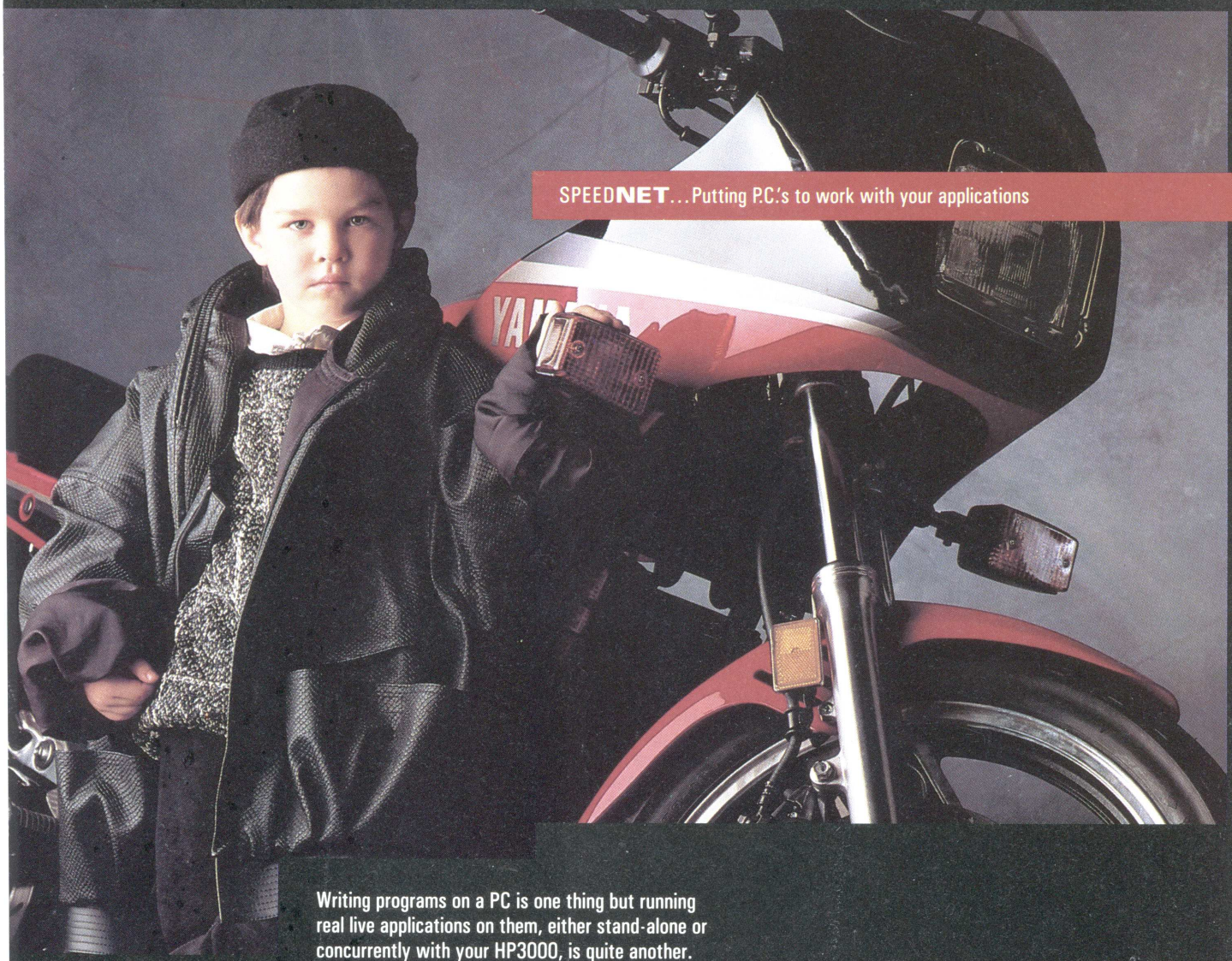
EMC² **EMC Corporation**

EMC Corporation is pleased to announce the commencement of trading of its common shares of stock on the New York Stock Exchange, under the symbol EMC.

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ROGI is available for the HP 3000 family of business computers and PC compatibles.

Contact Deborah Smith, Brant Computer Services Ltd., 2605 Skymark Ave., Mississauga, Ontario, Canada L4W 4L5; (416) 238-9790.

Circle 371 on reader card

TMAuthor Upgrade Announced For TeachMe/3000

Innovative Software Solutions, Inc. has released Version 3.0 of TMAuthor, the authoring language for its TeachMe/3000 computer-based training series for the HP 3000.

The latest version of TMAuthor enhances the linkages into the HP 3000 MPE operating system, simplifies the handling of question/answer routines, user-written routines and menu processing, and improves the formatting capabilities available to course authors. TMAuthor and TeachMe/3000 can be used to develop training courses, menu processing systems and application/security handlers.

TMAuthor V3.0 ($3,000—new users; $2,500—users with TeachMe/3000 modules) is accompanied by sample lesson modules, a comprehensive manual, the TeachMe/3000 driver program and utility programs.

Contact Innovative Software Solutions Inc., 10705 Colton St., Fairfax, VA 22032; (703) 273-5025.

Circle 372 on reader card

ICHART Produces Laser Flowcharts

Indigo Software Ltd. has begun shipping ICHART, the first flowchart/data flow diagram product specifically designed to take full advantage of the text and graphics capabilities of laser printers. It combines advanced flowcharting features including multiple symbol libraries, automatic symbol connection and multiple page charts, with many features of a desktop publishing product. Users now can produce publication-quality flow diagrams using an IBM PC compatible, such as an HP Vectra, and a laser printer.

ICHART's External Reference capability allows you to easily access information created and maintained outside your current flowchart. For example, you can directly examine a Lotus 1-2-3 spreadsheet, word processing document or another ICHART flowchart from a specific symbol on your flowchart. Once you pick the reference symbol, you automatically can switch from ICHART to the external program to examine/modify the specified documentation and then return to your current chart.

Contact Barry Gillespie, Indigo Software Ltd., 560 Rochester St., Suite 400, Ottawa, Ontario, K1S-5K2 Canada; (800) 267-9976 or (613) 594-3026.

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CD-ROM Extensions Support ISO High Sierra

Microsoft Corporation has announced MS-DOS CD-ROM Extensions Version 2.0, with the ability to read discs pressed in both the original High Sierra file format and the new ISO 9660 version of that format.

The MS-DOS CD-ROM Extensions create a seamless interface between PCs and CD-ROM technology, so any PC application running under the MS-DOS operating system transparently can access files from any CD-ROM drive. This standardization frees CD-ROM application developers from the need to provide interface software for specific CD-ROM drives, while also providing users with the assurance that their drive will be able to read any disc.

The High Sierra format defines a standard format for CD-ROM discs that allows them to be read by a variety of computers running different operating systems and using different CD-ROM drives. The original version of this format was published May 28, 1986. A revised version, ISO 9660, recently was published by the International Standards Organization, making the High Sierra format into a worldwide standard.

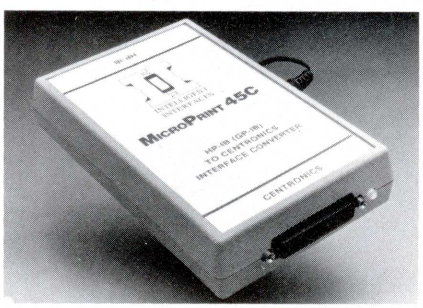
The MS-DOS CD-ROM Extensions require a PC running MS-DOS 3.1 or higher.

Contact Microsoft Corp., 16011 NE 36th Way, Box 97017, Redmond, WA 98073-9717; (206) 882-8080.

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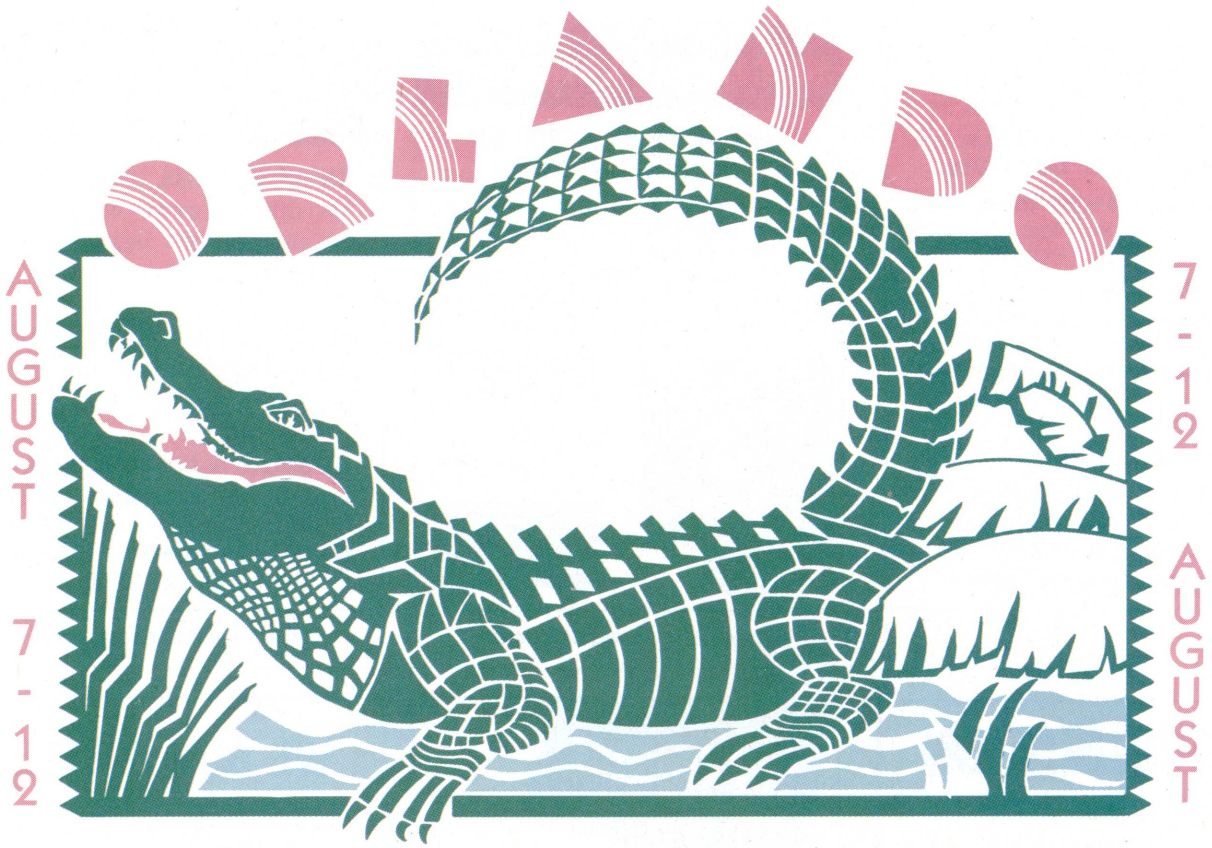
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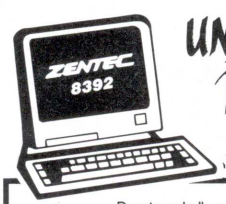
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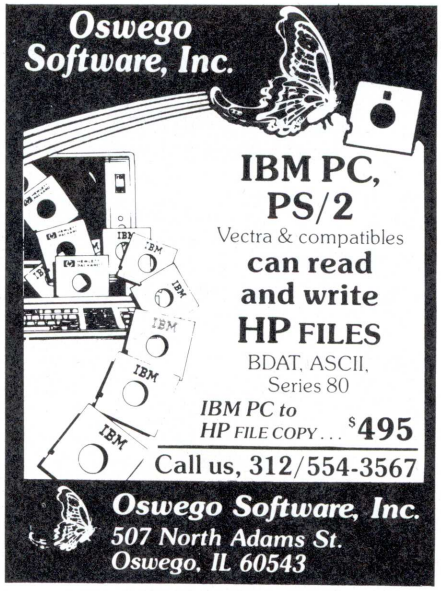
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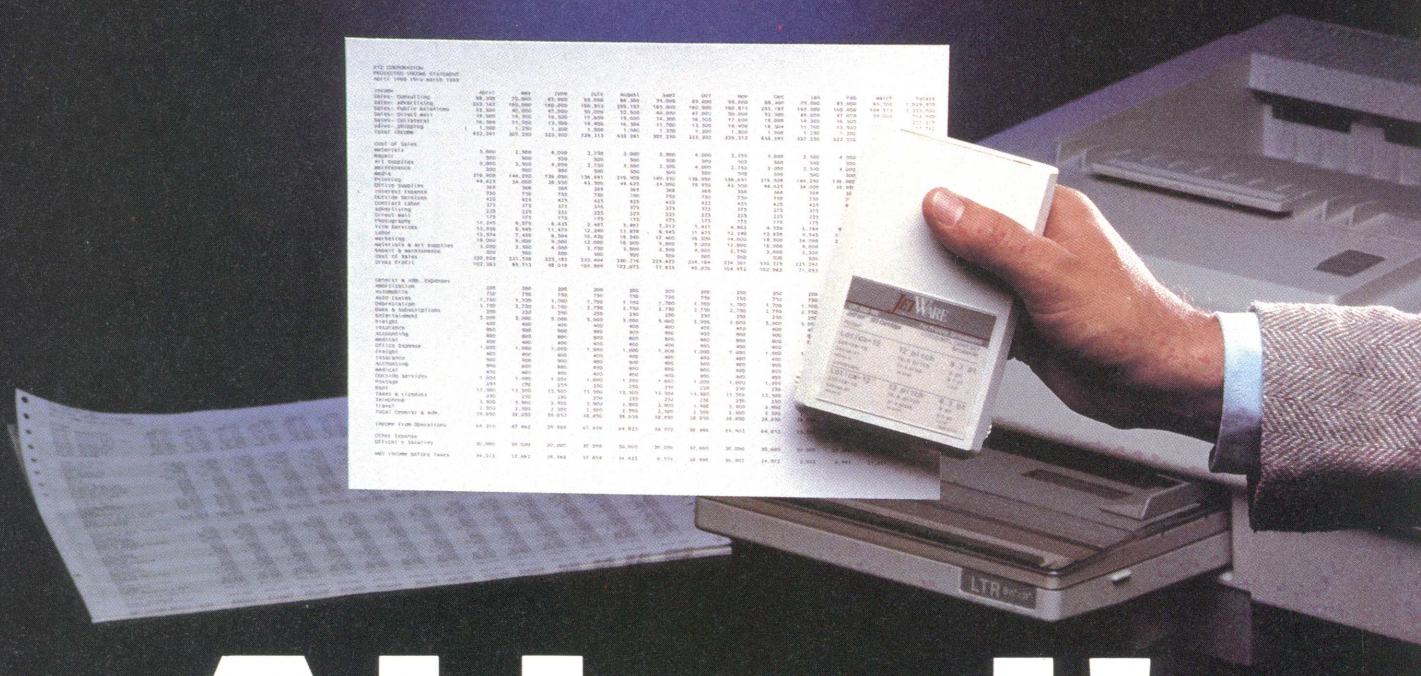
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[CALENDAR]

[MAY]

17-20: SCRUG '88 Technical Conference and Vendor Show, The Pasadena Center, Pasadena, CA. Pre-conference tutorial for new users May 17 (extra charge). Two-day vendor show May 18 and 19. Call Karen at (213) 453-5664 or write P.O. Box 84219, Los Angeles, CA 90073.

18-20: CAP International 1988 Hard Copy Supplies Conference, Marriott Long Wharf, Boston, MA. Contact Martha Johnson, CAP International, One Snow Rd., Marshfield, MA 02050; (617) 837-1341.

19: GHRUG, Inc. (Greater Houston Regional Users Group, Inc.) one-day meeting, Hilton Hobby, Houston, TX. For more information, contact Suzanne Spitzer, (713) 977-3193.

25: DAYMUG (Dayton Metropolitan Users Group) and KYRUG (Kentucky Regional Users Group) joint meeting, Ramada Inn, I-71 and Pfeiffer Rd. exit, Cincinnati, OH. Contact P.G. Landwehr, Vulcan Corp., (513) 621-2850.

27-28: The Wisconsin Regional Hewlett-Packard Users Group Annual Spring Conference, Lake Lawn Lodge. Contact Karen Masters, (414) 786-6700.

30-June 3: The International HP Users Conference, Goteberg, Sweden. Write Box 266, S-421 23 V. Frolunda, Goteberg, Sweden.

31-June 3: NECRUG Ninth Annual Eastern American HP Users Conference, The Trump Plaza, Atlantic City, NJ. Exhibitors call Jeri Fuller, U.S. Mortgage Insurance Co., (215) 825-4666.

[JUNE]

5-8: Datek Information Services' New Directions In High-Volume Electronic Printing — Technology, Markets and Applications; Boston Marriott Burlington, Burlington, MA. Contact Jack Gilbert, Datek Information Services, (617) 893-9130.

13-15: CAP International's 1988 European Electronic Printing Industry Conference, Amsterdam Hilton, Amsterdam, Holland. Contact Martha Johnson, CAP International, One Snow Rd., Marshfield, MA 02050; (617) 837-1341.

16: MINNRUG (Minnesota Regional Users Group) Breakfast Meeting, 7:00 a.m., Hewlett-Packard, St. Paul, MN. Topic to be announced. Contact Jim Gonsoski, (612) 379-0039.

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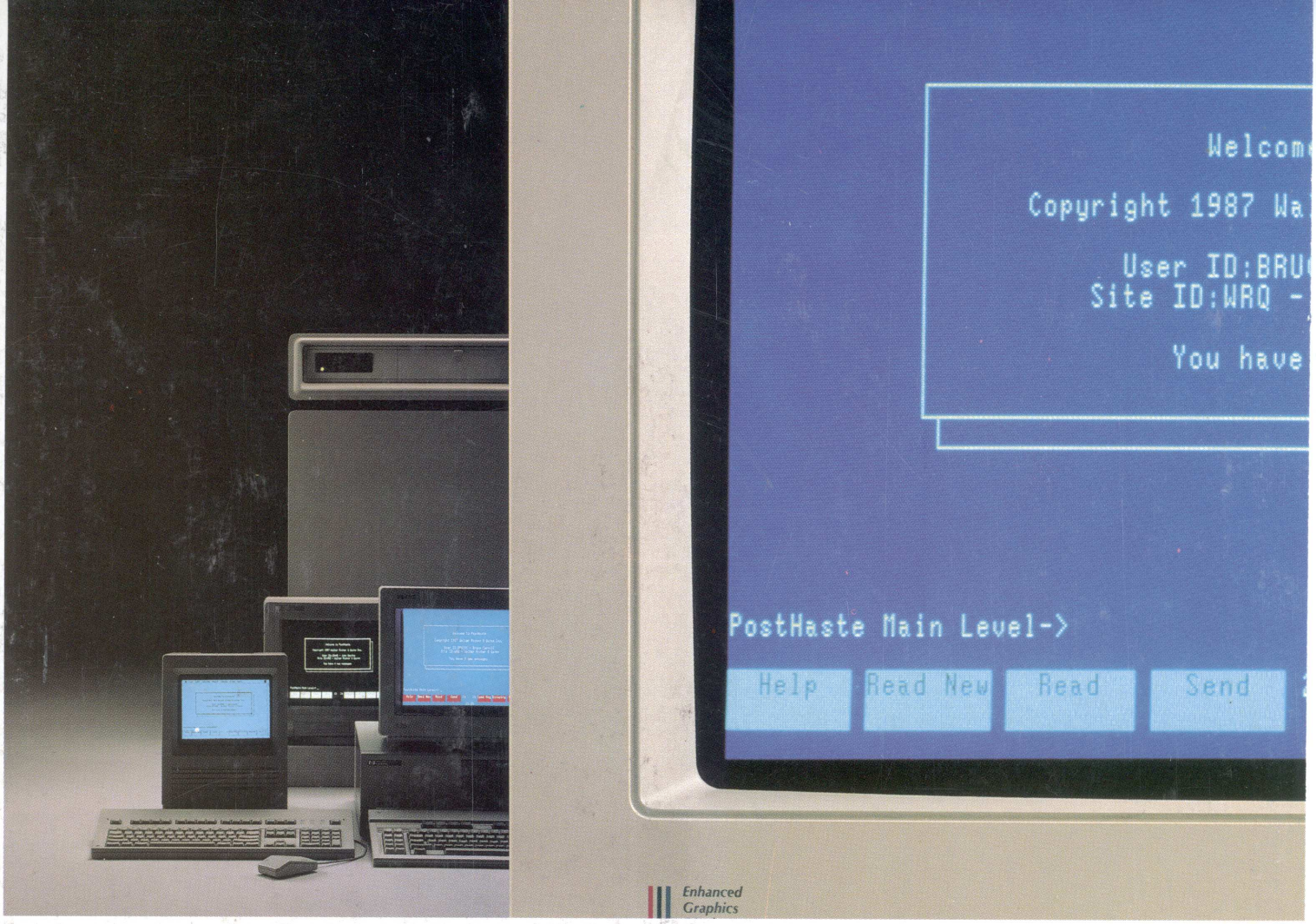
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PostHaste is designed for speed and efficiency. Its standard Image database is subject to a minimum number of I/O s to post a message. This adds up to speed. PostHaste keeps overhead low so your other applications run faster, too.

PostHaste contains all the features you've come to expect and some you've probably wished for: security, distribution lists, message archiving, automatic mail notification, local storage and printing.

PostHaste is the only electronic mail package written with personal computers in mind. Use Reflection® to connect your PC to the HP 3000 and you'll be free to write and store mail on your PC. You'll be able to run the mail session in the background while working with your favorite PC or Macintosh applications.

Find out about the new package that makes electronic mail practica for you. PostHaste.

POSTHASTE

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